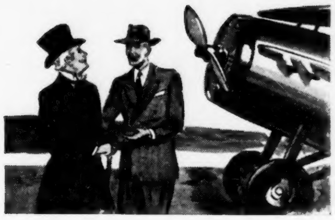
The Sky's The Limit

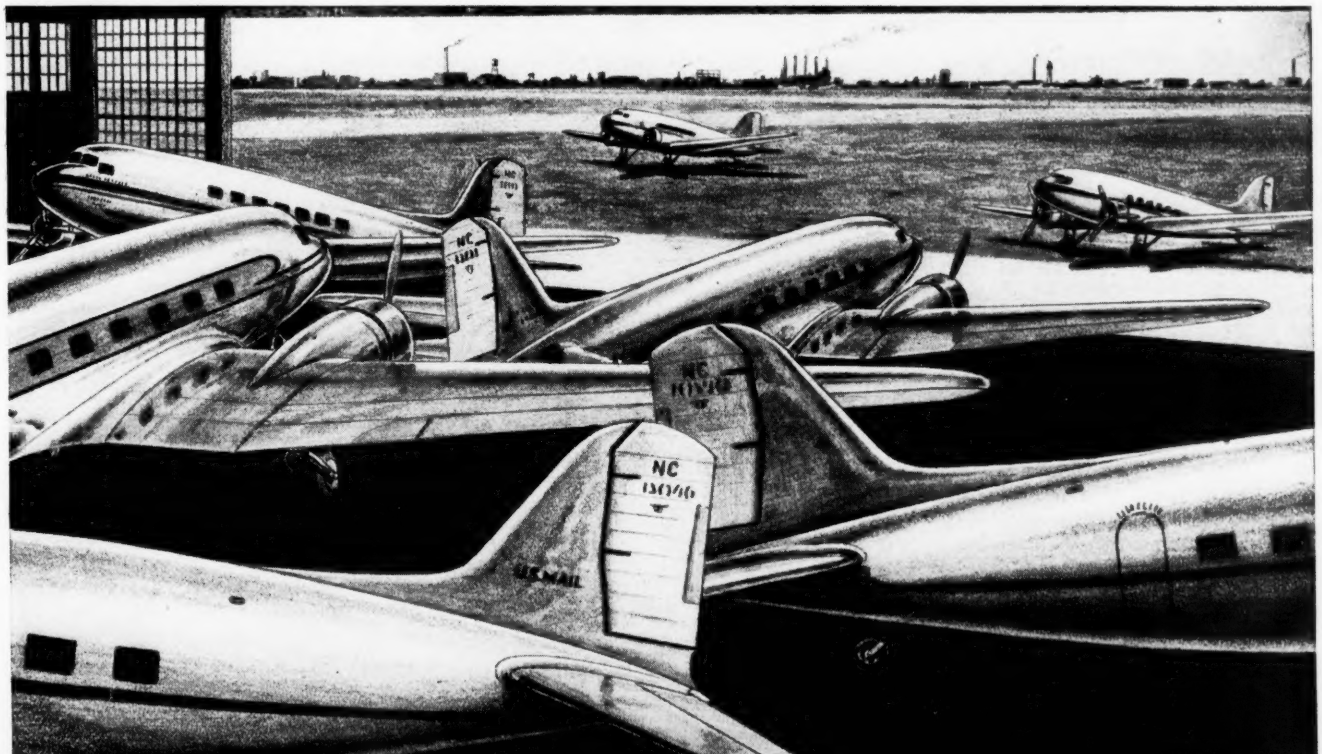


Suppose someone who lived forty or fifty years ago—say one of the founders of Mathieson—could pay us a visit today. And suppose we could have the pleasure of showing him the sights of 1941, of explaining the vast changes that have taken place since the turn of the century. What do you think would amaze the old gentleman most? If he were one of the pioneers who founded Mathieson, we believe he would be most interested in the revolutionary changes wrought by chemical progress and in the part his successors have played in building the present-day America. We would go about telling him the story as we tell it in this series of advertisements.

● Those, Mr. M., are airplanes. They were only a dream in your day. Now they're an accepted means of travel and transportation. Today you can journey from New York to San Francisco in only 10 hours. And speedier, more powerful ships are constantly being built.

In the development of this amazing industry, Mathieson Chemicals have contributed in many ways. The all-important dies used in making tools for plane and engine manufacture are conditioned with soap and grease containing alkalies. Dense soda ash is an essential raw material in the glass through which moderns look on a new world. Most important is the contribution caustic soda makes to the refining of high test gasoline for airplane engines. And in many another way — in upholstery, plastics, lacquers, rubber tires, lubrication oils and greases, even in those powerful landing lights, Mathieson products participate.

Yet the aviation industry is still young and Mathieson Chemicals have an active role to play in its growth and future success.



MATHIESON CHEMICALS

SODA ASH . . . CAUSTIC SODA . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . HTH PRODUCTS . . . AMMONIA, ANHYDROUS and AQUA . . . FUSED ALKALI PRODUCTS . . . SYNTHETIC SALT CAKE . . . DRY ICE . . . CARBONIC GAS . . . ANALYTICAL SODIUM CHLORITE

THE MATHIESON ALKALI WORKS (INC.)
60 E. 42ND STREET, NEW YORK, N. Y.

The Reader Writes—

New Approach to Research

With reference to the article "A New Approach to Research" appearing in the November issue of CHEMICAL INDUSTRIES, we are interested in obtaining a copy of the 43-page summary of new products, processes, or materials which might be developed to be of value to various industries and which the article states has just been published in mimeograph form.

W. R. MACLEOD, *Gen. Mgr.*,
King Laboratories, Inc.
Syracuse, N. Y.

Editorial Note: To other readers like Reader W. R. MacLeod who would like to have a copy of the summary mentioned in the November issue we suggest writing directly to Bert H. White, vice-president, Liberty Bank of Buffalo, Buffalo, N. Y.

Finds Statistical Section Valuable

We would like to inform you that the writer is greatly indebted to you and the publication of the Buyer's Guidebook.

He feels that without it, he would have been unsuccessful with respect to obtaining proper sources for the various chemicals and believes the Statistical and Technical Data Section is extremely useful.

THOMAS GONZALEZ, *Export Mgr.*,
Industrial Chemical Division,
Simmons Products Company,
New York, N. Y.

Magazine "Personality"

I find CHEMICAL INDUSTRIES interesting in all its varied phases. Some way, some how, you have found the means of covering the industry in a different manner than other publications. For this reason CHEMICAL INDUSTRIES has magazine "personality."

J. P. BARRY,
Redwood Derivatives,
Associated Hammond-Redwood Co.,
San Francisco, Calif.

Improving Patent Digest

I think that you could improve your Patent Digest by titling the patents so that one could spot patents of interest without getting tired eyes.

DR. A. R. CLARK,
Maplewood, N. J.

Guidebook Correction

We received your Buyer's Guidebook number for 1940-1941 and in looking through it to locate our position, we find that you have continued to list "ZIALITE: Tuttle Chemical Corp., N. Y. C." and "ZIALITE: Zialite Corporation, N. Y. C." in the blue section of the book.

The Tuttle Chemical Corporation is no longer in existence and has not been since 1937 and the Zialite Corporation moved from New York City in 1937. The Zialite Corporation is at the present time located at 143 Exchange St., Worcester, Mass. This correct address does appear listed under the States but this is the only place where it is correct.

We are writing to ask that if you do make any corrections in your next monthly issue, would you please make a notation of our new address?

DR. ERNEST D. WILSON,
Technical Director,
Zialite Corporation,
Worcester, Mass.

Heaven Forbid!

I suggest that you include more material in the Data Section and publish a Buyer's Guidebook Number twice a year.

University of Cincinnati Library,
Burnet Woods Park,
Cincinnati, Ohio.

Extra Copies of Supplement

I am wondering if you are having or have had any reprints of an item in your November, 1940 issue. It is "New Chemicals for Industry" and is a catalog of chemical products 1938-40. This was prepared for the National Chemical Exposition. If you have any reprints I am desirous of obtaining a copy for one of our men who is very interested. He feels that this will be a great help to him. He is willing to pay if necessary for the reprint.

M. S. GOFF, *Librarian*,
Service Department,
E. I. du Pont deNemours & Co.
Wilmington, Del.

In your November, 1940 issue of CHEMICAL INDUSTRIES, pages 546-568, we find your list "New Chemicals for Industry" so convenient a reference that one of our executives has asked us to secure two reprints if you may have them available.

T. H. HOFFMAN, *Librarian*,
Shell Development Company,
San Francisco, Calif.

Editorial Note: A few supplements "New Chemicals for Industry" are available. We will be glad to mail these to interested persons as long as the limited supply lasts.

A Working Tool

I wish to take this opportunity to tell you that CHEMICAL INDUSTRIES is more than just another technical magazine on our library table—it has become one of our necessary working tools.

HERMAN L. JOACHIM,
Consulting Engineer,
Los Angeles, Calif.

More New Chemicals

We certainly agree with the recent note printed by you in the Readers' Write Column referring to Director John C. Bird of Hoffmann-LaRoche, Inc. Our laboratory is likewise in favor of extending the description of new products. We are specially interested in new chemicals like the careful and well organized information given in the "New Chemicals for Industry."

By the number of interesting requests for information on the new products we have had announced, we consider CHEMICAL INDUSTRIES a journal having a wide appeal to the chemical trade.

H. W. SCHEIDER,
The Varniton Company,
Los Angeles, Calif.

Are There Others?

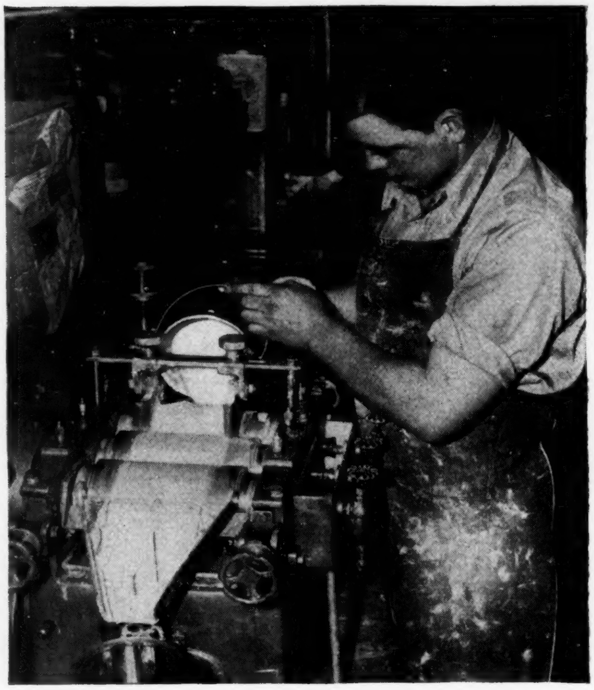
I am told that we are not listed in the Buyer's Guidebook Number in Associations and Societies Section. I trust that it is not yet too late to be listed in the next edition.

This fact has been drawn to our attention by several members, therefore, you may be assured of our appreciation for your courtesy.

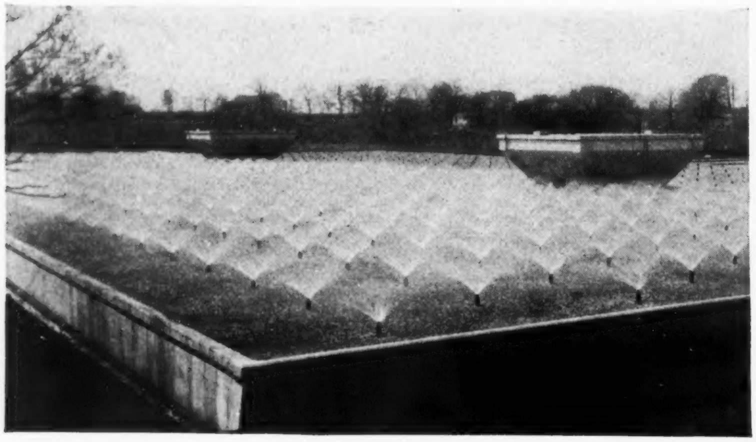
B. M. BLAIR,
Executive Secretary,
The American Leather Chemists Association,
New York, N. Y.

Editorial Note: We will be delighted to include The American Leather Chemists Association and any other associations or societies in the chemical or allied fields in the 1941-1942 edition who are not now listed. Secretaries of such groups are requested to supply us with the names of the officers and the secretary's address. The attention of secretaries of all associations and societies is also called to the Calendar of Events for 1940 published in this month's Statistical and Technical Data Section. It is our hope to increase the usefulness of this service to our readers by supplying on this page each month as complete a three months' Calendar of Events as can be assembled. Your active cooperation is solicited.

Life ON THE CHEMICAL NEWSFRONT

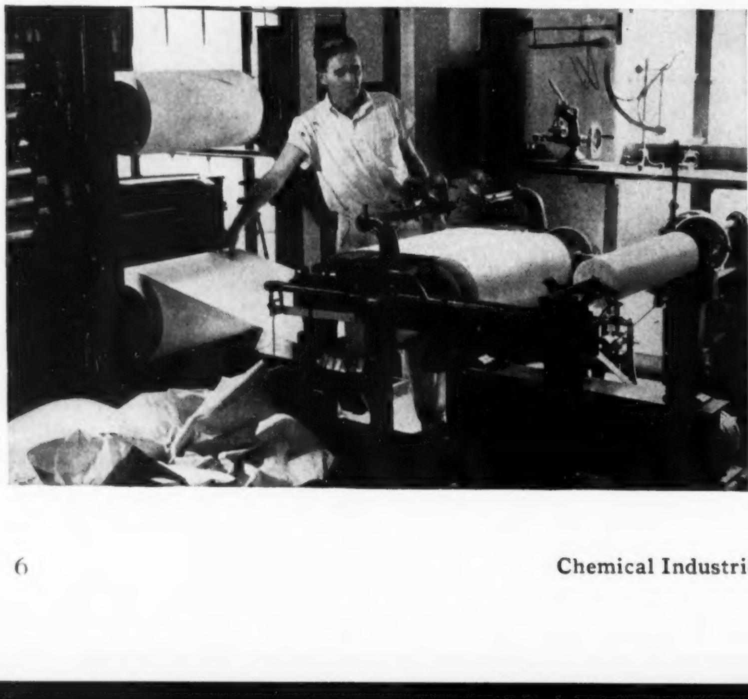


(*Above*) **SOYBEAN OIL PAINTS** are studied by workers at the U.S. D.A. Bureau of Agricultural Chemistry and Engineering, Urbana, Ill., in a research program intended both to develop new uses for agricultural products and to uncover new materials for use in industrial processes. Both farm and industry are profiting from the advances made by chemurgy.

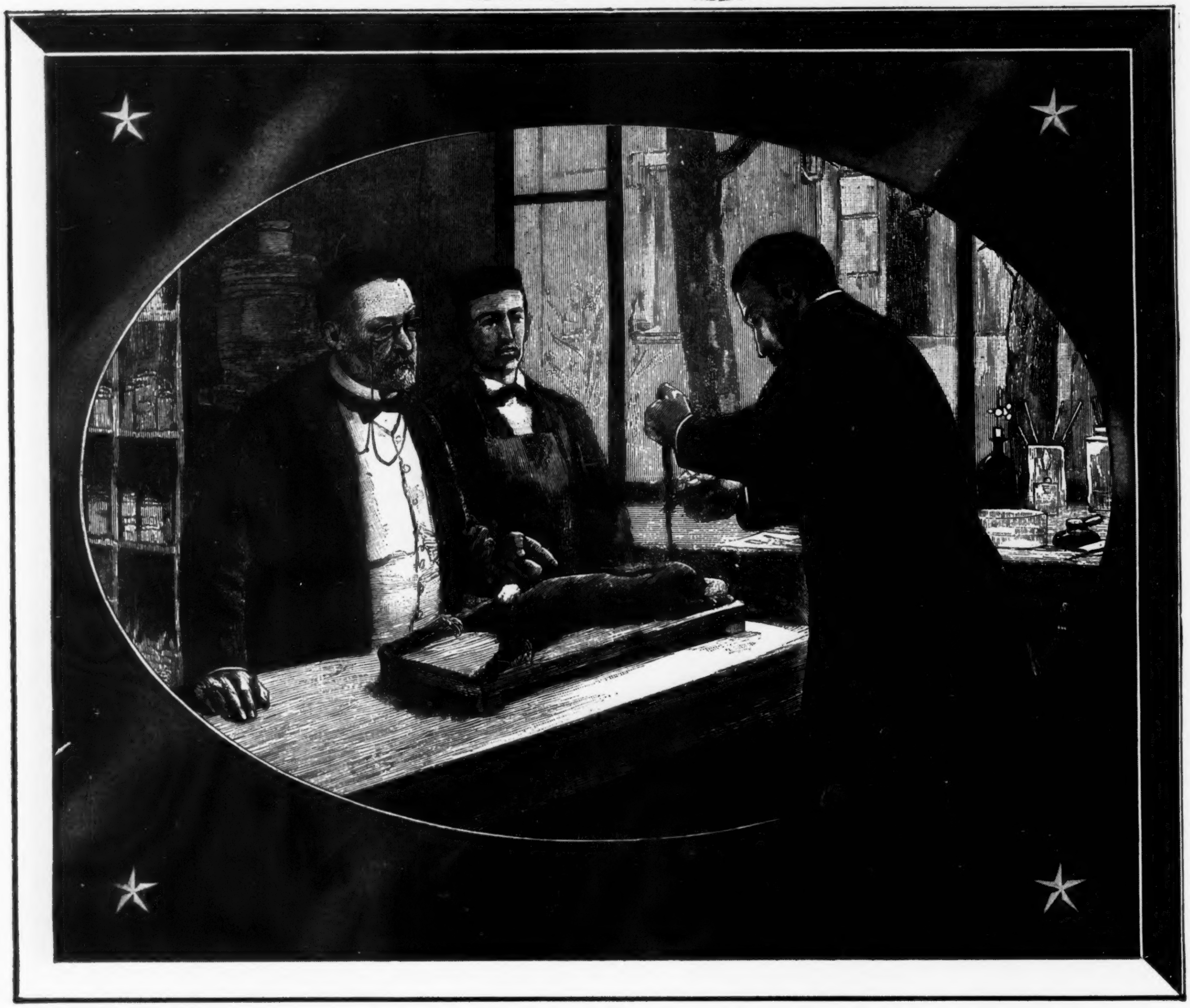


(*Left*) **SEWAGE TREATMENT** has opened a rapidly expanding market for chemicals. Sulphate of Alumina is extensively used to make sludge more porous and promote draining through screens, as well as in chemical coagulation processes to remove colloidal organic material. Cyanamid is a major producer of Sulphate of Alumina.

(*Below*) **PLAYGROUND SAFETY** is aided by chemistry as sand is sterilized by chlorinated water. Sand boxes in New York parks rest on a porous cement base, under which are porous pipes and a layer of gravel. Chlorinated water, forced through the pipes, permeates sand.



(*Left*) **THOROUGH TESTING OF PAPER** at the Bureau of Standards, Washington, D. C., reflects the increasing demands met by the paper industry. Paper manufacturers are assisted in meeting today's needs by Cyanamid's comprehensive line of paper chemicals. Further expansion of Cyanamid's service has been made through acquisition of the line of paper sizes formerly manufactured by Bennett, Inc., and now produced by Cyanamid.



CHEMICAL INDUSTRIES
The Chemical Business Magazine
Established 1914

A Threat to the Defense Program

LAST June *Chemical Industries* pointed out the necessity of exempting from the provisions of the proposed compulsory selective bill all chemists, chemical engineers and key foremen vitally needed in research and production. The editors of this magazine called this editorial to the attention of Representative James W. Wadsworth, co-author of the bill, and, in view of certain developments in the actual operation of the Selective Service Act, believe it is highly pertinent now to reprint Mr. Wadsworth's comments published in the August issue. "You mention the importance of exempting from the provisions of the proposed universal military service bill chemists and key foremen in chemical plants. Proponents of this bill, after extensive hearings before the Senate and House Military Affairs Committees, have reached the decision that it would be unwise to name, specifically, occupations or professions whose members should be exempt from the draft. It is better, we believe, to rely upon broader language which will make the intent of the Congress perfectly plain and yet not single out for especial consideration any profession or occupation. The language in the bill now agreed upon reads as follows: 'The President is authorized, under such regulations as he may subscribe, to defer training and service in the land and naval forces of the United States of those men whose employment in industry, agriculture or other occupations or employment is found necessary to the maintenance of the national health, safety or interest.' The local draft boards would be guided by such a provision, and I am sure could be trusted to administer it wisely in each particular case. Obviously, chemists engaged upon work of real value to the national health or interest and key foremen in chemical plants would, in all probability be exempt."

Actually the Act as passed provides for occupational deferments, not exemptions. There is some evidence that certain local draft boards will agree to a six-months deferment only, and with the understanding that by the end of such a six-months period or at most at the end of a 12-months period the employer will have secured and trained a thoroughly qualified substitute for the draftee.

Certainly such a position is not in agreement with the opinion expressed by the co-author of the Act, nor is it wise or sensible in view of the necessity of utilizing every last trained chemist and chemical engineer in the places where they are best suited to serve most efficiently in the defense program. Are we going to forget the bitter lesson learned in the World War and are we above following the example of the British who have seen to it that technically-trained men are excluded from the military forces?

It appears necessary to call certain facts to the attention of the administrative officers of the Selective Service Act and to the local draft boards throughout the country, particularly boards located in industrial centers.

First, the defense program has been greatly enlarged since the passage of the Act last summer, with the result that the need for chemists and chemical engineers is considerably greater than then anticipated. Second, the number of trained chemists and engineers is not inexhaustible, despite all loose talk to the contrary. Third, chemists and engineers are essentially specialists. As such they cannot be indiscriminately interchanged in key positions without adverse effects on research and production. Fourth, an alarming shortage of younger chemists and engineers already exists and these are the men most likely to be affected by the current interpretation of the Act by local draft boards. Fifth, the post-war period will find us seriously undermanned technically unless students in our universities pursuing technical subjects are encouraged to continue.

The mere possession of a chemical degree, as we have stated before, should not *per se* provide exemption from military training. But it is a dangerous threat to the success of the defense program not to exempt indefinitely technically-trained men where it is clearly shown that industry sorely requires their technical ability. As long as they occupy such strategic positions they should not be drafted for military service.

Editorial

The National Chemical Exposition: A canvass of the exhibitors at the recent National Chemical Exposition by the editors of CHEMICAL INDUSTRIES indicates decided satisfaction with the results obtained, and the Chicago Section of the American Chemical Society, sponsor of the Show, is most certainly entitled to heartiest congratulations.

Nor should the Chicago Section feel apologetic that the original intention of limiting the Show to chemical manufacturers was not carried out in practice. CHEMICAL INDUSTRIES, in its survey following the 1939 Exposition of Chemical Industries in New York, found that the overwhelming majority of those expressing opinions favored the inclusion of exhibits of equipment and apparatus.

Unquestionably the interesting and instructive National Industrial Chemical Conference Program, with its glittering array of celebrities, did much to attract visitors to the Exposition and should be repeated two years hence. On the other hand, the experiment of ending the Show on a Sunday, purely an experiment, was not a success and should not be repeated. The total attendance figures, while not as large as those reached in recent years at New York Shows, was sufficient to prove that the Mid-West needs and will support an exposition staged in alternate years with the Exposition of Chemical Industries at the Grand Central Palace.

CHEMICAL INDUSTRIES has one suggestion to make. Possibly chemical manufacturers would be more inclined to exhibit in both places were the Expositions held late in September rather than in December. Many chemical sales executives are unwilling to bring salesmen in off the road for a solid week during the busy contract period. At least the suggestion of choosing dates outside of the contract season is worth further consideration. Finally, we believe that the management of the Chicago Show should make a still greater effort to "zone" the Show so that the chemical producers, the equipment manufacturers and the apparatus and laboratory supply houses are grouped more systematically.

We thoroughly appreciate the practical difficulties involved, but such grouping could make for a still more attractive and better balanced exposition, and might well lead in time to cooperative efforts on the part of each of these three divisions that would provide visitors with a much more comprehensive over-all picture of what this chemical industry of ours really is and its degree of importance in our industrial life. While such expositions are not designed for the lay public and are not expected to perform a "public relations job" reaching "Mr. and Mrs. John Doe," is there not perhaps an equally important public relations problem for the chemical companies and the equipment manufacturers to think of in connection with their own customers and prospective customers?

"C. I.'s" Own Fireside Chat: The President's report to the nation on Sunday, December 29, was unquestionably designed primarily to arouse the American public to a more acute realization of the seriousness of the international situation. For the first time Mr. Roosevelt brought home to the citizens of this nation the fundamental fact that if our preparedness efforts are to be successful and we are to become an "arsenal of democracy," then the notion that this can somehow be accomplished with little or no dislocation of the normal life of the country is fallacious and dangerous. Highly significant were the following words from the President's fireside chat:—

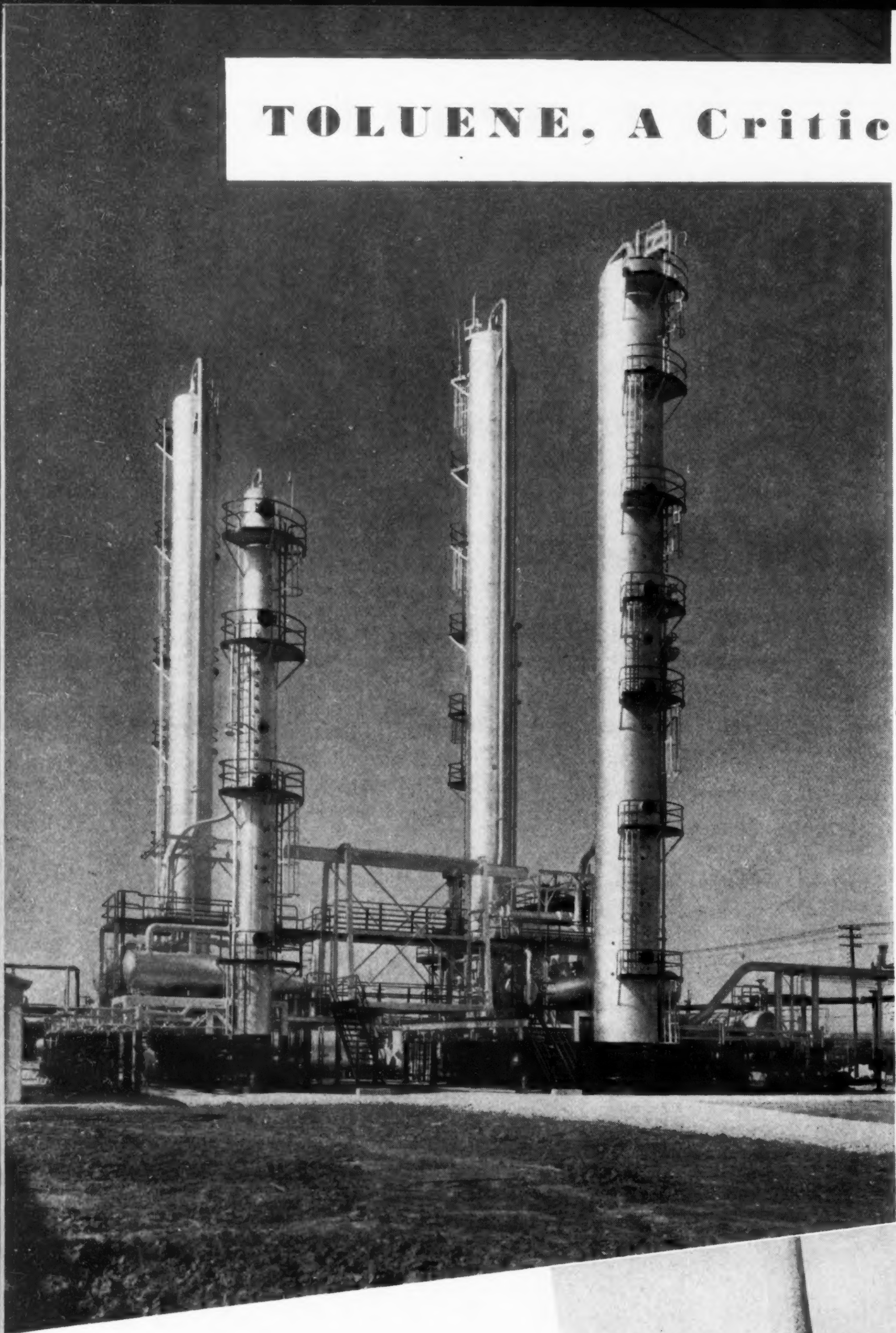
"We must have more ships, more guns, more planes—more of everything. And this can be accomplished only if we discard the notion of 'business as usual.' This job cannot be done merely by superimposing on the existing productive facilities the added requirements of the nation for defense."

Each and every one of us then must readjust ourselves to the new order. New responsibilities must be assumed. The editors of CHEMICAL INDUSTRIES believe that it can best serve the nation in the present crisis by providing month by month through 1941, timely and informative articles on various chemical phases of the defense program. Readers will find in this issue the following authoritative discussions:—"Toluene, a Critical Material," by Frank C. Croxton and R. Shutt, Battelle Memorial Institute; "The Applications of Synthetic Resins in Modern Airplane Construction," by H. N. Haut, Bellanca Aircraft Corporation, and "The Availability of the Newly Developed 'Neo-Fats' As Drying Oils," written by Dale V. Stingley of Armour and Company. Scheduled for an early issue are the following:—"Bauxite—The Raw Material for Aluminum Production," by Lawrence Litchfield, Jr., vice-president of The Republic Mining and Manufacturing Company, and "Our Manganese Supplies," by Langbourne M. Williams, Jr., President of The Freeport Sulphur Company, and in subsequent numbers such subjects as synthetic rubber, synthetic textiles, chromium, tungsten and tin will be reviewed by equally well-known and distinguished authorities stressing the close relationship that each of these materials bears to the development of an adequate defense for the Western Hemisphere.

Further, over the next two years CHEMICAL INDUSTRIES will undertake a comprehensive survey of the United States in twelve major geographical divisions, intimately visualizing production and consumption of chemicals in each of these areas, together with detailed information and statistics on such topics as availability of natural raw materials, labor resources and transportation facilities.

All of these special articles, of course, are in addition to the regular monthly features which will be still further improved and enlarged.

TOLUENE, A Critical Material



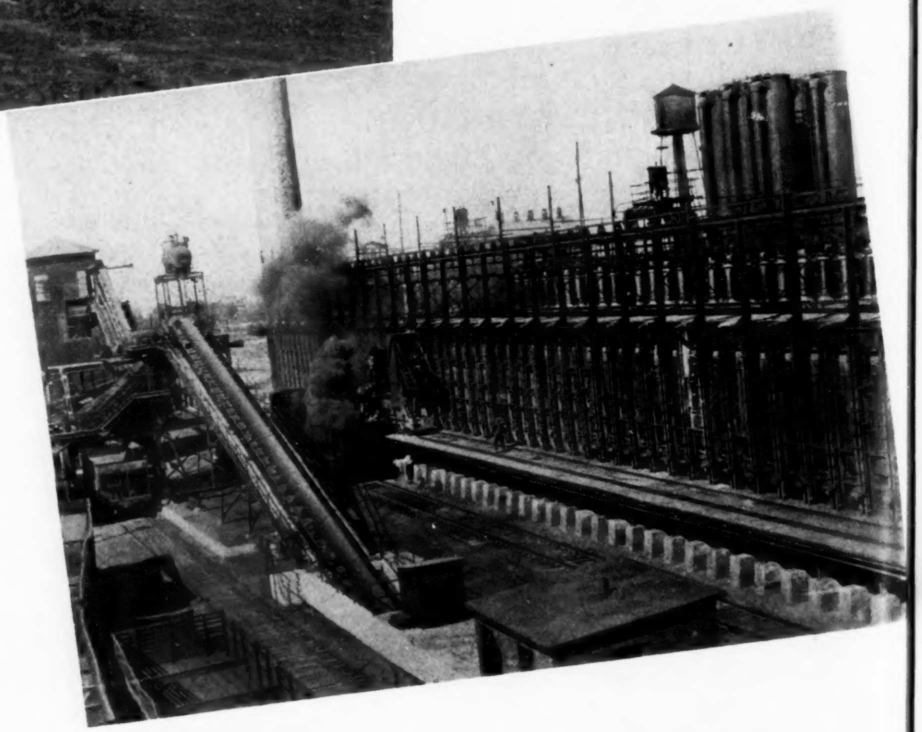
Although Our Toluene Production Is Approximately Five Million Gallons Over World War Output, Defense Officials Are Calling For More and the Petroleum Industry is Being Called On to Meet This Vital Requirement.

NATIONAL defense depends for its effectiveness on adequate supplies of a number of strategic materials. High among these in importance is toluene since it is necessary not only for the production of TNT but also as a raw material for the manufacture of dyes. It is, in addition, a valuable lacquer component.

Under normal conditions more than 98 per cent. of this country's toluene is derived from coke-oven light oil. In spite of present increased coke-oven activity as a result of the increased steel production to supply war needs and the consequent enlarged production of toluene, there would be a serious shortage of toluene in the event of war if this were the only source of supply.

The largest production of toluene during the World War was 14,985,646 gallons in 1918. In 1939 our production was 19,767,200 gallons. The Industrial Materials Division of the National Defense

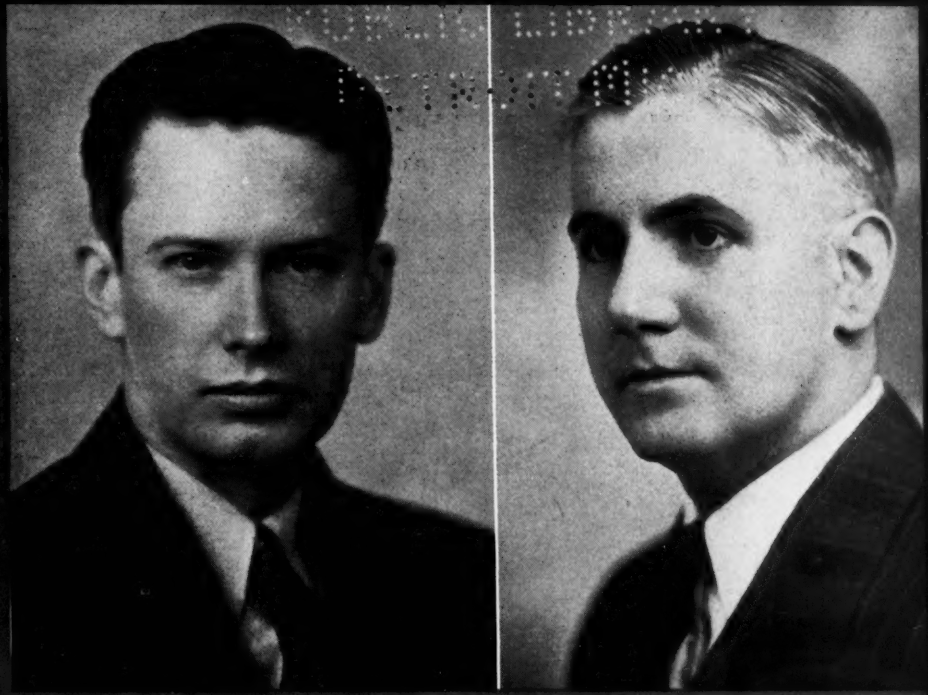
(Above) Latest contribution to defense needs. Shell Oil's Houston plant for manufacture of toluene from petroleum.



(Right) Typical by-product coke plant. Under normal conditions more than 98 per cent. of this country's toluene is derived from coke-oven light oil.

Advisory Commission estimates American wartime toluene needs at 10-30 million gallons per year. In addition, shipments of this material to England during the first half of 1940 indicate a further requirement of approximately 10 million gallons for export. As a maximum, therefore, 40 million gallons or double the 1939 production from coke ovens may be needed.

During the World War additional quantities of toluene were obtained by absorption from carbureted water gas, but since that time this source has become of decidedly less importance. Recent developments have indicated that it is possible to produce readily from petroleum any desired quantities of nitration-grade toluene for war needs.



The Authors

Uses

TNT (trinitrotoluene) is a very important military high explosive. Its stability, insensitivity to shock, and proper degree of fragmentation (the property which determines its effectiveness as shrapnel explosive) form a combination of characteristics not equalled by any other explosive. Although deficient in oxygen by 74 per cent., it may be mixed with ammonium nitrate, as in Amatol, to provide more complete combustion. In actual combat the smoke of a TNT explosion is often very useful in checking firing accuracy. TNT is manufactured from toluene by nitration with mixed acids, generally in two or three steps. The product melts at approximately 80° C. and thus may be poured into bombs and shells to facilitate loading operations. Information from six plants operating during the latter part of the World War indicated an average production cost for TNT of about 16c per pound, over one-third of which was contributed by nitric acid. U. S. Bureau of Mines estimates state that approximately 1,594,000 pounds of nitrotoluenes were used in industrial explosives in 1938. This is seen to be extremely small when compared with the 200,000,000 potential pounds of TNT represented by the 15,000,000 gallons of toluene produced in this country in 1918.

Besides increasing the supply of toluene through petroleum sources, the wartime demand can be met in part by the substitution of other explosives, such as trinitrobenzene (TNB), for TNT. Our production of benzene is greatly in excess of the production of toluene (about 5 to 1), and is increasing with increased coke oven activity, without any significant increase in demand as a result of war activities. The failure of TNB to reach an importance equal to that of TNT in the last war appears to depend on two factors: (1) difficulties in the manufacture of TNB, and (2) physical properties of TNB such as higher melting point and greater shattering power than TNT. These difficulties can probably be overcome.

Although benzene is the most widely known aromatic hydrocarbon used as an antiknock agent in motor fuels, toluene has a nearly equivalent octane number. In addition it promotes the compatibility of ethyl alcohol and gasoline in blends of the type which have been used to a limited extent in some parts of Europe. It is very doubtful that alcohol-blend gasolines will be marketed in the United States except under a government subsidy on certain farm commodities from which alcohol can be made.

Another important use of toluene is that of starting material in the manufacture of a large number of organic chemicals such as benzaldehyde, benzoic acid, saccharin, and dye intermediates such as nitrotoluenes, toluidines and methyl anthraquinone. Toluene was of special importance during the World War since the khaki dye used on many of the U. S. military uniforms was derived from it.

The solvent applications of toluene are numerous. Whether added as an ingredient or whether inevitably present in certain aromatic solvent naphthas, it is an important part of many paint and varnish formulas. It is perhaps the most widely used hydrocarbon lacquer diluent. A French patent[1] describes it as a modifier for furfural in the selective solvent extraction of olefin-paraffin mixtures. In this application it increases solubility in the same way that benzene does in the Edeleanu refining of lubricating oils with liquid sulfur dioxide. Although a close chemical relative of benzene, toluene shows significantly less toxicity due to lower volatility and lower solubility in blood.

Toluene Situation 1915-1918

In 1915-18 toluene was required for TNT in much larger quantities than the coke-ovens could supply it, in spite of the fact that every by-product coke plant had a light oil recovery installation. In the Spring of 1917, 75 per cent. of our output of toluene was being exported to the Allies. From that time on to the end of the war it was necessary to provide not only this country's entire needs but also a considerable fraction of the requirements of Great Britain, France and Italy. Although the United States manufactured only half as much high explosives as either England or France during the 19 months of its participation in the war, our monthly rate at the cessation of hostilities exceeded the combined output of both of those allies. This fact not only shows the effect of a long war on the industrial activity of belligerents but also clearly indicates the effectiveness and necessity of government underwriting of uncertain investments for the manufacture of war materials. Since the coke-oven production was practically incapable of further expansion, many other sources were investigated and two were used.

Toluene from Carbureted Water Gas

A considerable part of the illuminating value of the carbureted water gas supplied to urban dwellings in those years

★ *By Frank C. Croxton and R. Shutt, Battelle Memorial Institute* ★

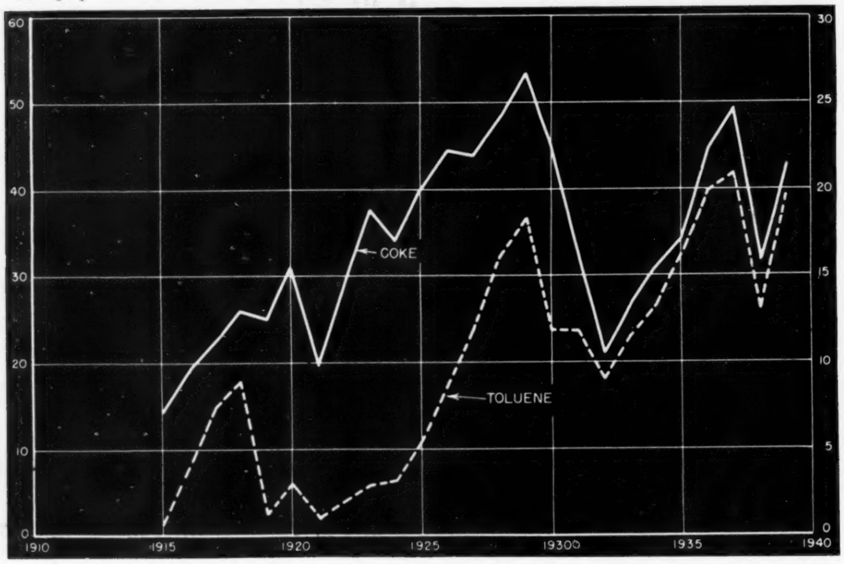


Fig. 1. Toluene production at by-product coke ovens and by-product coke production, 1915-39.

was attributable to its content of normally liquid aromatics such as benzene, toluene and xylene. The sacrifice of a portion of the candlepower rating of the consumers' gas was insignificant compared with the military value of the toluene recoverable by absorption. It was known that these aromatics could be removed commercially by standard methods of absorption in relatively non-volatile liquids from which they could be recovered by distillation. The rather small quantity of toluene available at each of the gas plants made many absorbers necessary and they were confined to the larger water-gas installations. Over 50 such plants were built largely with the aid of a portion of the $100,000,000 invested or loaned by the Government for the enlargement of our toluene output. It was found advisable to return the benzene to the gas in order to retain as much illuminating value as possible. The Welsbach incandescent mantle was in rather general use in 1917 and consequently candlepower specifications were of decidedly less importance. Although removal of toluene and xylene reduced the candlepower 25-35 per cent., the B.t.u. rating was lowered by only 5 per cent. or less. The first of these toluene plants to start production was in Washington, D. C. Operating on 5000 MCF of carbureted water-gas per day it yielded 200,000 gallons of toluene in about one year. It is interesting to note that the toluene content of the light oil from carbureted water-gas is generally nearly twice as great as that of coke-oven light oil. Although the British "C" Process made use of relatively cheap tar to absorb light oil from gas, the advantages of absorbents such as creosote, straw oil and mineral seal oil were soon found to offset their greater cost, and they were rather universally adopted. From June 1916 to the end of the war 14 privately owned and operated gas scrubbers with a total capacity of 3,190,000 gallons of crude toluene per year were installed. The Army Ordnance Department negotiated for 31 recovery plants with a rated annual toluene production of 4,100,000 gallons, but 17 of the 23 which were built in 1918 had an actual production rate of 4,450,000 gallons per year. In spite of the fact that the water-gas scrubbers were indispensable during the war, their operation could not be justified at post-war toluene prices. The last of those built by the Ordnance Department was shut down 11 days after the signing of the armistice. According to the contracts under which the Government subsidized plants were built, the equipment was to be removed at Government expense within one year from the end of the war unless the gas companies cared to purchase it. A questionnaire in the latter part of 1918 revealed that there were practically no prospective uses for the shut-down recovery plants. Four which were unfinished were not considered worth completing. Only limited use of toluene in motor fuel production was thought to be possible although the price of gasoline in 1918 was 22c per gallon.

Toluene from Petroleum

In 1917 it was already known that certain petroleum crudes contained relatively high percentages of aromatics such as benzene, toluene and xylene. By distillation these could be concentrated to some extent but it was not practical at that time to make a nitration grade toluene from this source. In England the problem was attacked from the nitration end and a method was devised for producing TNT from a petroleum fraction with a toluene content of but 50-60 per cent. After a preliminary treatment to remove olefins, the toluene was mononitrated, the paraffinic hydrocarbons were then removed by distillation, and nitration was continued in the usual way. Such a modification was resisted in the United States and this attitude retarded the development of toluene from petroleum, although it may also be argued that a somewhat dangerous practice was avoided at the same time.[2] Since American nitrators required toluene which contained less than 0.5 per cent. paraffins it is not surprising that the Rittman process (about 1915 to 1916) for cracking petroleum to obtain toluene was not a commercial success.[2] Its product was reported to be 89-93 per cent. pure toluene after removal of olefins. A half million dollar cracking plant erected by one of the explosives companies was put in operation but it was shut down and scrapped by the end of 1916. Although it was pointed out in the technical literature during the war that cracked petroleum sources were entirely adequate for our toluene needs, the details of the isolation of this valuable compound in nitration grade purity were not worked out even with a government fixed price of $1.50 per gallon. Solvent naphtha cracking was somewhat more successful but did not contribute a significant quantity of toluene.

Toluene Statistics

The extraordinary fluctuations of both production and price of toluene during the last 25 years are shown in Table I. The prices are averages over each year and thus do not reveal a short time high of $8.00 per gallon during 1915. Figure 1 compares by-product coke production and toluene production during the period 1913-1939. It will be observed that the two show similar tendencies from year to year although between 1924 and 1932 the ratio of toluene to coke increased considerably. A recent tabulation of

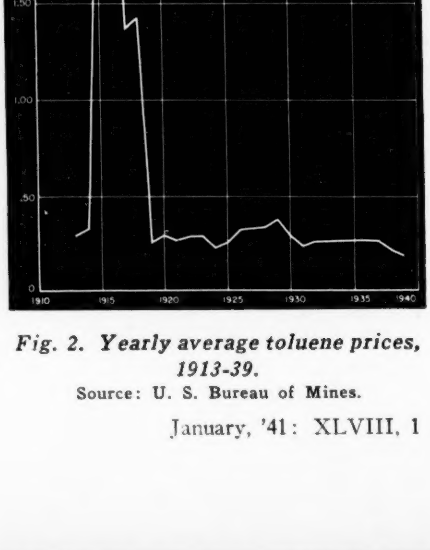


Fig. 2. Yearly average toluene prices, 1913-39.
Source: U. S. Bureau of Mines.

toluene statistics[3] will be seen to differ somewhat from those in Table I since they give "sales" instead of "production" from coke plants, and, in addition, sales of toluene from tar refiners for 1935, 1938 and 1939 are listed under production from such refiners. The effect of wartime toluene demand in 1915-18 is evident in the prices charted in Figure 2. Although its price has been reasonably steady since the World War, a recent downward trend was broken by the resumption of hostilities in Europe. Export prices in the neighborhood of 50c per gallon have been known this year and this will possibly tend upward until the conclusion of the war. The average price of the 4 million gallons of toluene exported in the first six months of 1940 was 44c per gallon and this export volume amounted to 40 per cent. of our domestic production.

Toluene Situation—1940

In 1918, 8,861,948 gallons of toluene were obtained from coke-oven light oil, 4,527,345 gallons from gas works absorbers and 1,596,353 gallons from coal-tar refineries, a total of 14,985,646 gallons. This was a year's requirement for high explosive manufacture during the World War. In 1919-22 the peacetime level of toluene production is seen in Figure I to

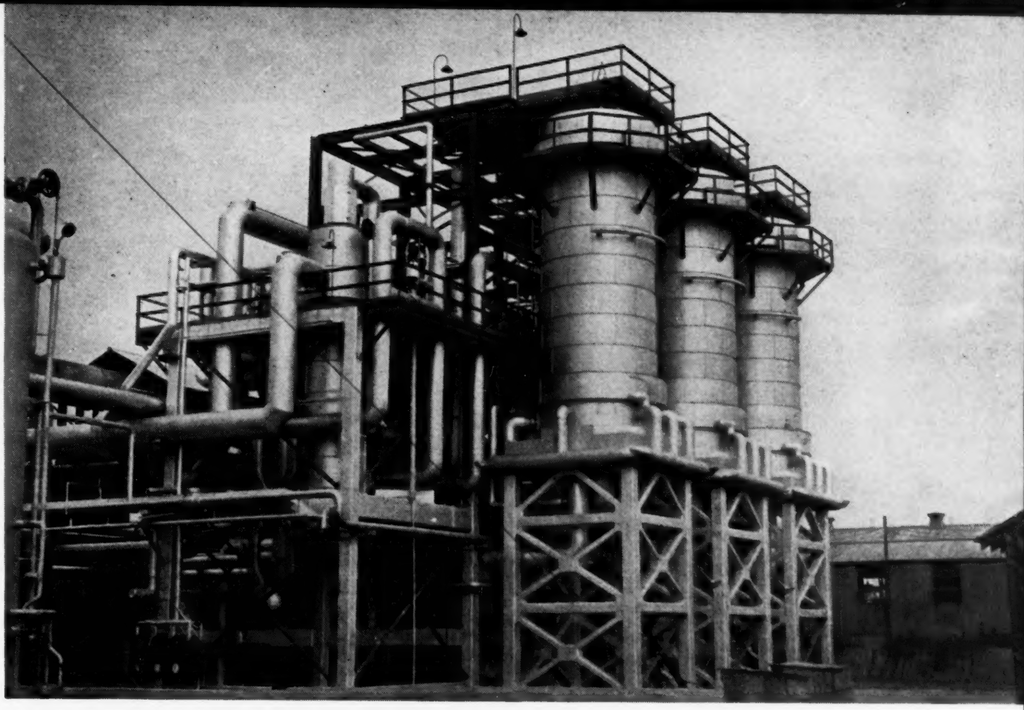
Table I. Production and Prices of Toluene from By-Product Coke Ovens. 1913-1939.

Sources: U. S. Bureau of Mines, Minerals Yearbook. U. S. Tariff Commission, Syntnetic Organic Chemicals. U. S. Production and Sales.

	Toluene Production Gallons	Toluene Sales Unit Price Dollars per Gal.
1913		.29
1914		.38
1915	623,506	2.45
1916	3,939,636	2.85
1917	7,395,174	1.37
1918	8,861,948	1.43
1919	1,160,136	.263
1920	2,997,791	.300
1921	969,511	.281
1922	1,993,278	.292
1923	2,885,294	.291
1924	3,185,431	.238
1925	5,457,144	.261
1926	8,791,452	.337
1927	12,093,590	.339
1928	16,097,856	.341
1929	18,343,295	.386
1930	11,833,202	.299
1931	11,832,932	.244
1932	8,941,235	.269
1933	11,539,107	.271
1934	13,281,794	.275
1935	16,026,438	.275
1936	19,807,383	.274
1937	20,896,724	.265
1938	13,021,080	.219
1939	19,767,200	.194

Note 1: The following figures for toluene production from coal-gas, water-gas and oil-gas are available: 1917—1,035,813; 1918—4,527,345.

Note 2: The following figures for toluene production at tar refineries not connected with tar producers are available: 1917—1,788,843; 1918—1,596,353; 1919—510,957; 1935—1,750,113; 1938—3,068,490; 1939—4,587,916.



Houdry catalytic reforming unit.
(Courtesy E. B. Badger & Sons Co.)

have been less than 3,000,000 gallons per year, so that in the war years little difficulty was encountered when the entire output was devoted to explosives manufacture. Since 1935 the annual production of toluene has been approximately 18,000,000 gallons. A considerable part of this can be used for munitions, but probably not all. As the export demand and prices rise, new sources of toluene will be necessary and will be developed with the help of the enormous advances in science and technology during the last 20 years, particularly in the field of petroleum refining.

In 1917 the Burton petroleum cracking patents had been in effect only four years. Yields, quality and economy of operation were very low compared to those now realized in to-day's combination cracking units charging as much as 30,000 barrels of crude per day and in which it is now possible to crack oil for 0.5c per gallon. The knowledge of hydrocarbon chemistry and methods of conversion has increased unbelievably in 20 years. It is not surprising, then, that the petroleum industry has become the logical source for nitration grade toluene which may be required quickly and in large quantities.

Since Borneo crude contains considerable quantities of aromatics which can be concentrated to fractions containing 50 to 60 per cent. toluene, this is another source of toluene as indicated by British practice in the last war. However, the difficulty of obtaining a pure product and the remoteness of the fields make it assume a distinctly minor role in this country. The National Bureau of Standards has shown that the toluene content of Mid-continent crude is approximately 0.33 per cent., an amount too small to consider isolating commercially except under extraordinary conditions. It is of interest to note that naphthas of the so-called paraffinic type are more likely to contain appreciable amounts of aromatics than are those of the naphthenic type. A paper on petroleum solvent naphthas which was delivered at the Detroit meeting of the American Chemical Society (Sept. 1940) described the highly aromatic solvents produced by close fractionation of virgin naphthas. Aromatic Naphtha No. 1 contained 60 per cent. toluene with nearly all of the remainder being naphthenes and paraffins. This will be seen to be very similar to the product from Borneo crude oil, nitrated by the British during the World War. The great value of such a mixture in times of unusual demand for high explosives lies in its substitution for much of the pure toluene used by the paint industry. There is thus released a considerable gallonage of coke-oven toluene which may be purified to nitration grade.

The non-catalytic pyrolysis of refinery gases yields aromatic hydrocarbons, one example from the literature reporting a recovery of 1.86 per cent. toluene from butane at 850° C. Although the yield is low and the temperature is high the abundance and cheapness of the raw material may partially or entirely offset these disadvantages.

As part of a study of the hydrogenation cracking of tars it has been shown that cresols can be converted to toluene in 60 per cent. yield. Since the price of the product is still less than that of cresol, the process would obviously not be economically practical.

In the cracking process it is believed that paraffinic hydrocarbons are first dehydrogenated to mono-olefins which may then be cyclized to naphthenes or, with further dehydrogenation, to aromatics. By the use of suitable catalysts the reaction may be so directed as to form a predominance of the desired aromatic compounds. The complete reaction in a single step is known by the formidable

name of dehydrocyclodehydrogenation. The patent literature covers the preparation of benzene, toluene and xylene from normal hexane, normal heptane and normal octane respectively. A number of catalysts are claimed, and the reaction proceeds at atmospheric pressure and at cracking temperatures of approximately 500-600° C. The gasoline manufacturer finds these normal or straight-chain paraffins to be very undesirable components of his product in these days of high-compression automobile engines. The knock ratings of those found in the gasoline boiling range are very low. Normal heptane has an octane number of zero while that of normal octane is —17. The elimination of this type of hydrocarbon would make the problem of producing a 75-85 octane gasoline somewhat easier. The separation of such a group is far from a simple matter but what can be done is discussed below. This appears to be such an attractive method of synthesis, however, that other sources of the straight-chain paraffins should be sought. Natural gasoline which is absorbed from natural gas and is also known as casinghead gasoline is the logical choice since it is highly paraffinic and since its production in 1939 amounted to more than 2 billion gallons. Narrow-boiling distillates from paraffinic crudes would serve nearly as well. Patent specifications indicate that, from normal heptane, a once-through toluene yield of 76 per cent. has been obtained and has been raised to 93-95 per cent. by recycling unconverted material.

Separate Naphthas

When the above process is used on a mixture of hydrocarbons such as a naphtha it resembles catalytic reforming. In converting crude petroleum into commercial products it is generally desirable to produce as much gasoline of saleable quality as is possible. The usual procedure is to separate straight run naphthas by distillation, crack certain of the intermediate distillates and perhaps residuum and then blend the cracked and straight run products and some additives to give the finished gasoline. The knock rating of uncracked gasoline is very low in most cases and the knock rating of the final product is lowered by its presence. If it is desired to eliminate this effect the straight run naphtha may be reformed. Whereas cracking is the conversion of large molecules into smaller ones, reforming is the alteration of certain types of molecules to give more desirable properties. This alteration involves dehydrogenation, aromatization and some cracking and is therefore very similar to the operations performed on the normal paraffin compounds above. In reforming low grade naphthas the primary purpose is to produce a motor fuel component of good anti-knock characteristics. Since low molecular weight aromatics are formed in the process, toluene will be recovered as a by-product bearing only a portion of the expense of the process by which it is made. Reforming costs should not exceed 0.3 cents per gallon. The increased popularity of catalytic methods of petroleum conversion makes it appear probable that toluene from this source will be produced by catalytic reforming which allows better control of products than the thermal method.

A recent development known as the Gulf Polyform Process[4] reforms low octane number naphthas non-catalytically in the presence of cracking gases. Relatively high conversions are obtained and the product is rich in aromatic hydrocarbons. In one example a straight-run heavy naphtha was "polyformed" to give an aviation fuel containing 26.7 per cent. aromatics of which 40 per cent. was toluene. This process has been proved to be commercially sound for the production of high octane gasoline components. It would only be necessary to add purifying equipment in order to manufacture toluene.

Petroleum Raw Material

All new toluene production facilities now in prospect, contemplate petroleum as the raw material. Two plants are to be built under Universal Oil Products Company license in the Middle West. They will catalytically aromatize normal paraffins or roughly fractionated mixtures of the same. The Humble Oil and Refining Company has recently received a contract from the War Department for the construction of a $10,000,000 plant to produce toluene.[5] This company has already produced two tank cars (20,000 gallons) of nitration grade toluene for test purposes. Humble is said to have offered to manufacture from petroleum as much toluene as coke ovens are making now. The Shell Oil Company has announced that a contract has been let for a half million dollar toluene plant at the Houston, Texas, refinery, where approximately 2,000,000 gallons per year will be produced, and this can be stepped up to 7,000,000 gallons per year by a supplementary process. In addition to these recent commercial developments, other large refiners could manufacture toluene, under license, by one of these methods by installing suitable equipment and utilizing raw materials already available at the refinery. The failure of petroleum companies to expand facilities for toluene production in recent years must be attributed largely to the uncertainty of the toluene market and not to any lack of technical information.

A word in regard to the storage of toluene will indicate that this phase of the problem involves little if any difficulty in light of developments of recent years. If the annual toluene requirement in time of emergency is estimated to be 30,000,000 gallons, then a six months' supply could be stored in only three tanks of the large size in common use in tank farms. This is less than 1 per cent. of the gasoline alone in storage on October 12, 1940. The quantity, therefore, is relatively small. Scores of gasoline oxidation inhibitors have been developed in recent years. When added to storage toluene in minute amounts, they would impart adequate stability just as they do now to gasolines containing varying amounts of the several aromatics. Evaporation losses are insignificant in the case of toluene. Since one of the outstanding advantages of TNT as an explosive is its stability, it is obvious that quantities of this material can also be assembled in anticipation of any emergency. This would serve to relieve some of the pressure on nitric acid production and may easily become important if reliance is placed on importations of Chilean nitrate for unusual demands.

In 1918 the numerous water-gas scrubbers for toluene recovery were built when prices of this product were in the neighborhood of $1.50 per gallon and such a price was necessary for their economical operation. Present prices of not more than 50 cents per gallon would not justify their present use. All of the Ordnance Department water-gas scrubbers were shut down 11 days after the signing of the armistice since the rapidly falling toluene demand and prices made their continued operation impractical. The situation now is somewhat different in that new sources of toluene are being established in time of peace. The practical synthesis of toluene has arisen naturally from the outstanding technical advancements of the petroleum industry in recent years. As pointed out earlier the expense of producing toluene from petroleum is very low although the initial installation of equipment may be rather costly. If the investment can be amortized in a relatively short period, then upon the return of normal conditions, petroleum as a source of toluene may become a serious threat to the by-product coke industry as far as toluene production is concerned. It is only a step too, to the manufacture of benzene and the xylenes from petroleum in enormous quantities. The passing of the emergency probably would not leave the country with a large, obsolete toluene capacity but rather with a new source of the lower aromatics which may persist for years or even indefinitely. It is difficult to estimate the nature of the readjustment which would be made by the by-product coke-oven operators. It is evident, however, that the entire chemical industry must give much thought to the peacetime utilization of the greatly increased output of many materials so that they will not become an embarrassment as did the excess productive capacity during the post-war period through which we passed but a few years ago.

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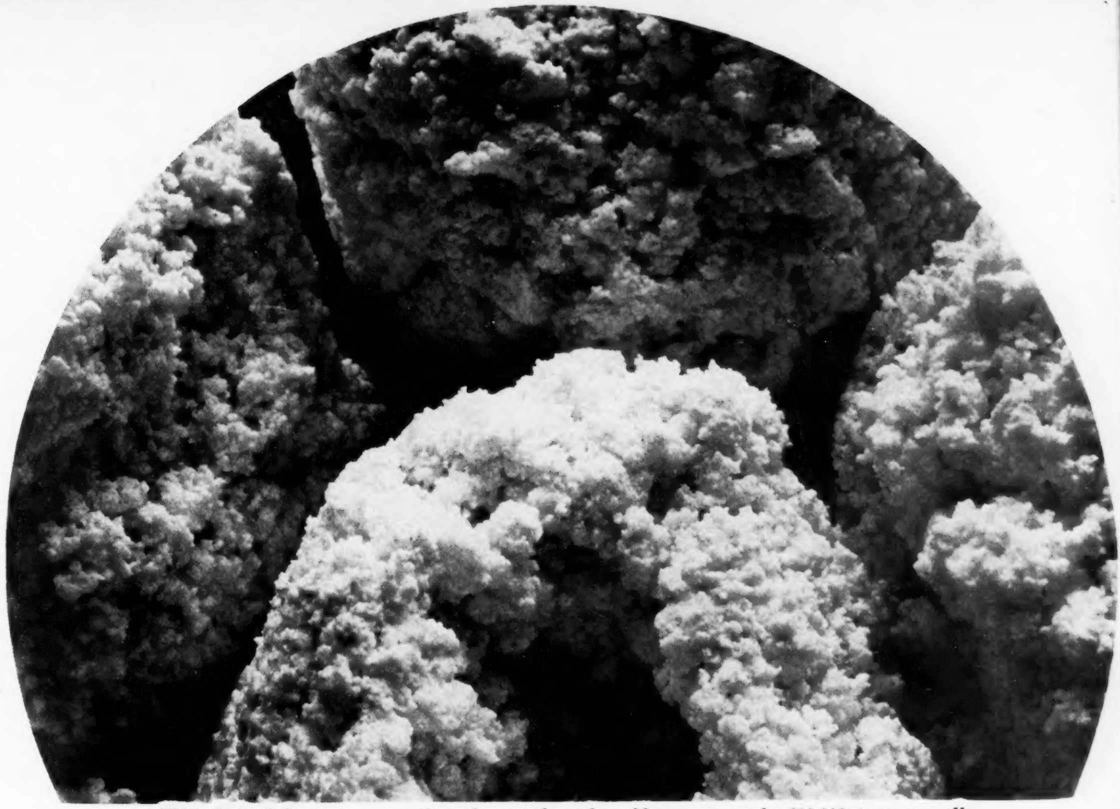
2. A. Bender, Chem. & Met. *16*, 657 (1917).
3. Chem. and Met. *47*, 573 (1940).
4. Refiner *19*, 301 (1940).
5. Wall Street Journal, Nov. 1, 1940, p. 3.

THE MARCH OF EVENTS 1940



With United States consumption of natural crude rubber now nearly 600,000 tons annually, the problem of quickly developing a synthetic rubber industry assumes a major place in America's defense plans. Photograph shows new "Butyl" in raw state.

THE year 1940 has passed into history and time alone will assign to it its relative importance in the march towards eternity. But we can be certain of one or two things about the year that has just passed into space—one, that the democratic way of life is being seriously challenged; two, that, if it is to be preserved, we must be prepared to defend it.

No longer can we speak of the present European War as a "phoney" war. The events created by Germany's successful "blitzkrieg" through the Low Countries and France last Spring came as a horrible shock to 130 million people in America, totally unprepared to believe that such things could happen.

Not one reader of "Chemical Industries", we believe, can scan through the Chemical Chronology, 1940, which follows, without becoming impressed with the terrible urgency that confronts us here in the United States.

Between the lines of this terse digest of events of 1940 we see American chemical industry forced to turn from the paths of peace to the preparation for possible war; we visualize research programs, striving for newer and better things for living through chemistry, possibly sidetracked or at least delayed; we find new processes, new methods, and new products being rushed through to the production stage because they are possible "ersatz" products and not because the economics of the day insist upon any such undue haste; we develop fears that many of the best research brains of the country will be taken from the research laboratories and put to devising horrible methods of killing those who should be our peaceful neighbors, friends, even co-workers in scientific pursuits; we fear that there still is not that mutual understanding between industry, labor and government that must exist if we are to properly be prepared to meet any threat to our homes, our lives and our way of life.

We enter 1941 with most of our problems of 1940 greatly intensified. But the American chemical industry cheerfully accepts these problems and will solve them successfully. American chemical industry is indeed one of our most important lines of defense. Adequate supplies, adequate equipment, adequate personnel will somehow be mobilized for the task ahead.

Sacrifices on the part of capital, management, labor and government will be necessary to achieve what will in periods of seeming despair appear impossible of attaining, but of the final result there can be and must be no doubt. While time has been lost, never to be regained, yet much valuable and vitally necessary groundwork was laid in the final months of 1940. Upon this foundation we must build swiftly but surely.

Chemical Chronology, 1940

January

U. S. dependence on foreign sources for natural crude rubber lessened slightly when Standard of New Jersey announces plans for commercial production of "Buna" synthetic rubber by end of '40—Standard to operate under patents acquired from German I. G.—Federal government agencies investigate Ruzicka Patents for wood coke briquets as first step in developing a Northwest metallurgical industry—Westinghouse atom smasher makes first public appearance at research party Jan. 29 at East Pittsburgh Laboratories—Engineers of that company report new steel hardening furnace using "blanket" of gas to prevent "singeing" metal while hardening at temperatures as high as 2000° F.—Chemical Industries conducts symposium on subject "Why Not a Strictly Chemical Show?"—The Velo Cold Set Process of printing (adopted for New York's latest daily newspaper "PM") announced by J. M. Huber, Inc.—Pittsburgh Plate Glass develops Nucite, a definite improvement over conventional school blackboard—Phillips Petroleum starts initial installation for production of neohexane at Borger, Tex.—New synthetic hydrocarbon is made by thermal alkylation and has valuable properties as a blending agent in aviation motor fuels—Du Pont's vice-president and director of research, C. M. A. Stine, receives Perkin Medal Jan. 12—Rutgers' Dean Read heads Chemist Advisory Council for '40—Chlorine Institute reelects S. W. Jacobs as president—Arsenate standards revised by Dept. of Agriculture—Food and Drug Administration rules that after Sept. 1 labels on pyrethrum powder and products must show per cent. of pyrethrins present—Parker Rust-Proof's bonderizing process patent for rust proofing upheld in U. S. District Court, Detroit; American Chemical Paint defendant company—William Neuberg, Inc., N. Y. City, becomes Neuberg Chemical Corp.—Prior Chemical appointed sole selling agent by Great Lakes Chemical (bromine and bromides)—Usual numerous year-end personnel announcements include:—R. E. Gaylord, general sales manager, Rumford Chemical; resignation of John H. Barton from National Oil Products' presidency; resignation of Bruce Puffer as manager of Commercial Solvents' industrial alcohol sales; appointment of Earl F. Clark as sales manager of Cowles Detergent's heavy chemical division—J. Harvey Gravell, late president, American Chemical Paint, leaves bulk of three million estate to employees—Paul Hooker, one of five brothers who developed Hooker Electrochemical dies of heart attack—Chemical markets ease slightly from peak levels of final '39 quarter—Toluol, acetone in heavy export demand—Quicksilver begins sharp price climb—Walter J. Murphy, formerly managing editor of "C. I." for ten years, appointed editor.

February

Fertilizer industry fights subpoenas which would force companies to bring 10-year records to Winston-Salem, N. C.—William B. Bell, Cyanamid president, and Dr. E. C. Williams, vice-president, Shell Development, debate on "The Executive and the Technologist" at dinner meeting, American Section, Society of Chemical Industry—"C. I." readers in second installment "Why Not a Strictly Chemical Show" indicate clear preference for continuance of present set-up of chemicals and equipment provided a special section or floor is set aside for chemical manufacturers—J. V. N. Dorr, George O. Curme, Jr. (Carbide), Irving Langmuir (G. E.), Leo H. Baekeland, Harry Steenbock (University of Wisconsin), William D. Coolidge (G. E.), Charles F. Wallace (Wallace & Tiernan), among those selected as national "Modern Pioneers of American Industry" by National Association of Manufacturers—Charles P. Gulick, board chairman, National Oil Products, elected president to succeed Barton—Swift opens Des Moines soybean mill, fourth of its type erected by company—General Atlas Carbon opens new "Pelletex" plant at Guymon, Okla.—F. M. Becket, Union Carbide consultant, re-nominated for presidency N. Y. Chemists' Club—Chas. Pfizer announces commercial production of acetyl triethyl citrate and acetyl tributyl citrate—John Stauffer, organizer and former vice-president, Stauffer Chemical, dies in San Francisco, aged 78—Twelve leading gypsum firms listed in U. S. probe of alleged monopolistic practices—W. B. Lawson, Harshaw vice-president, resigns—Chas. Pfizer enters fumaric acid production with new process—Italy prohibits quicksilver exports for duration of war—Wishnick-Tumpeer opens Dallas office—William H. Bradshaw, Du Pont, is '40 Jacob Schoellkopf medalist—Herbert G. Moulton heads American Institute of Mining and Metallurgical Engineers—Dow Chemical directors authorize purchase of 800 acres from Freeport Sulphur at Freeport, Tex., for plant construction—Commercial Solvents offers riboflavin (B_2 and G) in commercial quantities.

March

Cyanamid's Landis flays politics in agricultural research at National Farm Chemurgic Conference—Hugh A. Galt, president of both Columbia Alkali and Southern Alkali, and a vice-president of Pittsburgh Plate Glass, retires after 40 years service—Jefferson Lake Sulphur is new name for Jefferson Lake Oil Co.—War abroad stimulates American chemical exports—Dept. of Justice announces "in view of certain commitments made by the two principal domestic sulfur companies, the public interest requires no prosecution by the Anti-Trust Division in the sulfur industry at this time"—Dr. Willard H. Dow, president, Dow Chemical, presents service awards to 175 long time employees—W. B. Lawson, formerly a Harshaw vice-president, organizes W. B. Lawson, Inc., Cleveland—Work rushed on Dow's new $5,000,000 plant at Freeport, Tex.—Dow also announces new Dowmetal rolling mill at Midland to cost $500,000—Electro Metallurgical's new Sheffield, Ala., ferro-alloy plant goes into production—Merck & Co. reports successful synthesis of pantothenic acid, vitamin believed present in all living tissues—Prof. John M. Nelson, Columbia, receives Nichols Medal of the N. Y. Section, A. C. S.—National Association of Insecticide & Disinfectant Manufacturers suggests certain changes in disinfectant standards following introduction of cresylic acid produced from petroleum—More than 1700 executives attend Drug & Chemical Section, N. Y. Board of Trade dinner; hear Senator Nye discuss "War and Foreign Trade"—Dow Chemical announces sulfur of microscopic fineness for use in sprays—James T. Pardee, co-founder and board chairman of Dow, and W. J. Austin, president, The Austin Co., receive honorary degrees from Case School—Edgar M. Queeny, Monsanto president, discusses obstacles that tend to diminish flow of capital into industry at Tennessee Industrial Personnel Conference—R. W. Greeff & Co. appointed sales agents on certain products by Pittsburgh Coke & Iron—Innis, Speiden installs retirement plan for employees—Unexpected lag in chemical shipments attributed to large consumer inventories—Toluol scarcity becomes more acute—Export demand for sulfate of ammonia terrific—Speculation on site of Standard of New Jersey's plant to make "Buna" rubber ends with announcement of Baton Rouge, La., as the final choice.

April

Warren N. Watson, representing American chemical industry, attacks at public hearing proposed wage scales carried in Walsh-Healey Public Contracts Act—Earnings of chemical companies in first quarter of '40 close to record levels of last three months of '39—Harold F.

Pitcairn, elected president, Southern Alkali—Speculation by second hands reported in a number of industrial chemicals, solvents, etc.—Chicago Section, A. C. S., plans a chemical exposition in December—Extreme shortage of imported drying oils arouses great interest in possibilities of using dehydrated castor oil as a tung oil replacement—Dr. Gustav Egloff, Universal Oil Products, announced as '40 American Institute of Chemists' medalist—F. C. Mathers, University of Indiana, elected president, at 77th meeting, Electrochemical Society, April 24-27, Wernersville, Pa.—Du Pont building new addition to neoprene unit at Deepwater, N. J., to double production capacity—Deaths of the month include such great chemical leaders as Dr. Charles Lee Reese, 77, former Du Pont chemical director, and Carl Bosch, pioneer of the German dye industry and a Nobel Prize winner—Monsanto plans manufacturing facilities in Melbourne, Australia—Over 3500 of the Nation's chemists gather at Cincinnati for semi-annual check-up of progress in scientific research—Reichhold Chemical's researchers discuss new air-drying urea-formaldehyde-butanol resin films that rival high baking enamels for hardness; Armour & Co. chemists report on successful process for segregating unsaturated fatty acids from non-drying fatty acids, offering new synthetic drying oils to replace the natural oils now difficult to obtain from China, etc.—Savannah Naval Stores Exchange approves metal drums for rosin—Westinghouse engineers announce new alloy K-42-B developed after 7 years of research. Is said to be stronger than any known steel containing only 7 per cent. iron—A. C. S. $1,000 Prize in Pure Chemistry for '40 awarded to Dr. Lawrence Olin Brockway; Francis P. Garvan Medal to honor American woman for distinguished service in chemistry awarded to Dr. Mary E. Pennington—Ludlum Steel announces revolutionary new steel making process and designated by the name of "Pluramelting"—Du Pont announces polyvinyl alcohols (PVA) in commercial production; water soluble resins with unique properties—Atlantic Refining Co. celebrates 70th birthday—Dept. of Labor revises price index for chemicals—I. C. C. promulgates new regulations governing transportation of explosives by truck.

II GEMINI

May

Walter S. Carpenter, Jr., elected president of Du Pont, the second individual other than a Du Pont to head company since it was founded in 1802; succeeds Lammot Du Pont, who in turn becomes board chairman, succeeding his older brother Pierre—Two additional milestones in America's march to independence in rubber reached when Standard of N. J. announces new synthetic "Butyl," while B. F. Goodrich's president, John L. Collyer, proudly exhibits at a reception at Waldorf in N. Y. City tire made of the synthetic "Ameripol."—Joseph Turner & Co. named selling agent for Michigan Chemical, producer of bromides in new physical form of pellets—Cyanamid announces commercial production of new Melamac resins (made from melamine—until recently a chemical rarity)—Congress agrees to extending Hull Reciprocal Trade Agreements for three years—Commercial Solvents' plant for producing nitroparaffins commercially announced—Company adopts term "NP's"—Mathieson Alkali directors promote George W. Dolan, formerly assistant to president, and C. S. Glenn, director of operations, to vice-presidents—Hercules appoints R. T. Yates manager, domestic naval stores sales, and D. M. Houston in charge of export sales—Popular Dr. Robert Calvert, N. Y. City patent attorney, elected chairman, N. Y. Section, A. C. S.—American Institute of Chemical Engineers shatters all attendance records at Buffalo meeting—G. E. Research Laboratories announce isolation of rare form of uranium and known as "U-235"; according to scientists some day this material may be tremendous source of energy—N. Y. Chemists' Club makes Prof. Marston T. Bogert, Columbia, honorary member—H. S. Wherrett, Pittsburgh Plate Glass president, elected president, Columbia Alkali—Dr. J. Sam Guy receives Herty Memorial Medal—Dr. Vladimir N. Ipatieff, Universal Oil Products, receives '40 Willard Gibbs Medal from Chicago Section, A. C. S.—Dr. Harry L. Fisher, U. S. Industrial Chemicals, new president, American Institute of Chemists is introduced at Atlantic City annual meeting by retiring president, Robert J. Moore, of Bakelite—Wishnick-Tumpeer celebrates 20th anniversary—Walter L. Badger, Dow Chemical, named winner of the William H. Walker Award of the A. I. Ch. E.—America and chemical industry rocked by sudden "blitzkrieg" war against Belgium, Holland and France by Germany, and thoughts turn to domestic problems of national defense—Very little panic shown by buyers of chemicals who bank heavily on promises of producers to take care of legitimate needs of regular customers—Reilly Tar & Chemical reports more efficient method for conversion of pyridin into sulfapyridine—Prof. Claude S. Hudson receives '40 Theodore William Richards Medal of the Northeastern Section, A. C. S.—Potash Company of America produces caustic potash and potassium chlorate at Carlsbad, N. M., plant—Federal Trade Commission charges unlawful price-fixing conspiracy in complaint issued against Agricultural Insecticide & Fungicide Association—Caffeine and theobromine unavailable for spot purchases—Announcement made May 31 that initial construction on the Texas City chemical plant of Carbide will start at once; plant to make synthetic organic chemicals from refinery gases supplied by Pan-American Refining—Testimonial dinner held in honor of Prof. Edward Bartow, who retires as head of the dept. of chemistry and chemical engineering at Iowa—Dr. William H. Gardner, Brooklyn Poly, heads N. Y. Chapter, A. I. C.

69 CANCER

June

Chemical executives set an all-time new attendance record at annual meeting of Manufacturing Chemists' Association, Skytop, Pa.—J. Anton de Hass (Harvard Graduate School of Business Administration) sees U. S. export markets suffering regardless of which side wins European war—Lammot Du Pont and other officers of M. C. A. reelected—Carbide announces "Carbowax," new group of nonvolatile, water-soluble compounds—CHEMICAL INDUSTRIES editorially urges newly created Defense Commission be given all powers possessed by the War Industries Board in World War period—Mellon Institute's Weidlein appointed consultant to Defense Advisory Committee on chemical problems—He chooses as assistants:—Dr. D. P. Morgan, prominent chemical economist, and Dr. E. W. Reid, Carbide research fellow at Mellon—Robert E. Wilson, president, Pan-American Petroleum, named as expert on petroleum matters—Donald M. Nelson, once chief chemist and later executive vice-president, Sears, Roebuck, is coordinator of all national defense purchases—James H. Critchett, Electro Metallurgical, appointed member National Research Council—Cyanamid announces commercial production of acrylonitrile, intermediate which adds necessary valuable properties to synthetic rubber—Disinfectant and insecticide makers attack as unworkable labeling regulations which would force producers to show on and after Sept. 1 percentage of pyrethrins present in all pyrethrum products—Presidential proclamation bans exportation of long list of strategic chemicals except under State Department licenses—U. S. summons 20 American Republics and Dominion of Canada to Havana meeting to consider plan for a cartel to govern Western Hemisphere exports—Edgar M. Queeny announces he will serve Monsanto only half time from July 1 to election in order to work for Wendell L. Willkie's presidential campaign—National Association of Purchasing Agents holds Silver Anniversary meeting at Cincinnati—Marine Chemicals changes name to Marine Magnesium Products Corp.—Charges that major potash producers violated Sherman Anti-Trust Law squashed by U. S. District Court—Libby-Owens-Ford acquires controlling interest in Plaskon—General Chemical provides domestic source of potassium cyanide—Monsanto plans additional furnace capacity for elemental phosphorus production at Monsanto, Tenn.—Harshaw adds to Cleveland facilities for making fluorides—Eastern Gas & Fuel Associates announce plant to make ammonium thiocy-

anate, first in U. S. on commercial scale—William A. Harshaw, 78, founder and board chairman of company that bears his name, dies after six weeks' illness—William W. Buffum, 61, treasurer and director of the Chemical Foundation and right-hand man of the late Francis P. Garvan, dies in Montclair after brief illness—Purchasing of chemicals and raw materials soar, and several important shortages of spot stocks are reported—Manufacturers fairly successful in keeping stocks out of speculators' hands—Export market prices vary considerably from domestic contract price schedules—Plans announced for construction of chemical and explosives plants announced with total sum expected to reach well over a half billion dollars—Columbia University's Lincoln T. Work resigns to become director of research for Metal and Thermit—Charles L. Faust and Carl A. Zapffe, both of Battelle Memorial, recipients of '40 Proctor Memorial Award, American Electroplaters' Society—Flavin concentrate developed by U. S. I. is known as Curbay B-G—CHEMICAL INDUSTRIES conducts symposium on "Outlook in Strategic Chemicals"—Opinions expressed show favorable position of U. S. in 1940 as compared with 1914-1919—"C. I." again asks editorially for one-man direction of the Defense Commission.

LEO

July

Hydrocarbon Chemical & Rubber formed by B. F. Goodrich and Phillips Petroleum to produce "Ameripol" synthetic rubber—Shell Oil plans $500,000 plant at Houston, Tex., to produce toluol from petroleum-product vital to the national defense program—Three fertilizer companies lose appeal in Baltimore Court seeking to enjoin government use of company records obtained under sweeping subpoenas issued at Winston-Salem, N. C.—Special grand jury in Washington indicts five corporations and nine individuals on charges of fixing prices of gypsum board through a patent licensing arrangement—Many "bottle-necks" develop in national defense program—William H. Erhart, 72, board chairman of Chas. Pfizer & Co., dies after more than 50 years of service to his company—Desert Chemical rushes plant at Dale Lake, Calif., for production of anhydrous sodium sulfate—Dichlorethyl ether is found to be an effective soil fumigant—C. E. Adams, chairman of the boards of both U. S. Industrial Alcohol and Air Reduction, picked as senior administrative assistant to Edward R. Stettinius, Jr., member of the National Defense Advisory Commission—Special fluorescent dyestuffs are being used on carpets to make them glow in the dark—Fruits and vegetables are being packed in Pliofilm for local distribution in California; Bensel Price Corp. of Hollywood is pushing the idea—Wishnick-Tumpeer opens new Chicago research laboratory, and Pioneer Asphalt, an associated company, completes new plant in ambitious expansion program—R. & H. Chemicals Dept., Du Pont, reports lead-sodium alloys commercially available for use as drying agents for flammable materials, as well as for metallurgical work—Durez perfects new arc-resistant phenolic compound, Durez 8685—Monsanto purchases 138 acres at Trenton, Mich., near Detroit, for new plant to produce phosphates, etc.—National Fire Protection Association revises liquefied petroleum gas code—Frank A. Howard, president, Standard Oil Development, elected a v.-p. of Standard of N. J.—George M. Dunning placed in charge of general eastern sales by Michigan Alkali—Charles F. Kettering, General Motors, appointed honorary chairman of A. C. S.'s 100th national meeting scheduled for Detroit, Sept. 9-13—Audrey A. Potter, Purdue, awarded Lamme Medal for '40 by Society for the Promotion of Engineering Education.

VIRGO

August

Fertilizer companies still fight to invalidate government seizure of their records at Winston-Salem grand jury hearings—Cuban-American Manganese Corp. increases plant capacity of this strategic material at Cristo, Cuba, plant—A. R. Maas Chemical, Los Angeles, starts direct production of phosphoric acid from phosphorus, first plant of its kind west of Mississippi—Monsanto buys additional property directly across from main St. Louis offices and plant for future expansion—G. P. Vincent discusses in editorial pages of "C. I." commercial production of sodium chlorite by Mathieson Alkali and some of the uses of this new material—Important personnel changes of the month are:—election of T. S. Nichols, vice-president, Prior Chemical, as a director of Great Lakes Chemical; Harold W. Haines, formerly with U. S. I., as sales manager for Schofield-Donald; Reginald M. Banks as assistant to the president of Cyanamid; Charles H. Slater as division sales manager in charge of fine chemicals for J. T. Baker Chemical; J. Oostermeyer appointed vice-president, Shell Chemical—German representatives in South America said to be offering chemicals for delivery Oct. 1, and to be willing to post performance bonds—Ned Brundage resigns from Michigan Alkali to form Finger Lakes Chemical Co.—Chemical company earnings for second quarter of '40 generally show gains over similar period of '39 and with first quarter of current year—Seven investment banking firms underwrite $15,000,000 offering of term and serial debentures of Dow Chemical—Penn Salt manufactures "Kalo" a fluorine agricultural insecticide—William A. Converse, donor of William Gibbs Medal, dies in his 77th year—Tolerances for lead and arsenic residues from insecticide sprays on apples and pears revised upwards by federal government agency in charge—Disclosure of details of Gulf Oil's new Polyform Process made—Process combines polymerization with cracking in a unique manner and is hailed as still another step in petroleum industry's march toward higher gasoline yields and higher octane numbers—General Chemical to build heavy chemical plant in Detroit area—Hercules plans new $1,000,000 addition at Parlin, N. J.—William H. Mason, inventor of the Masonite process of exploding wood, dies at age 63—Lactic wool (casein fiber) is reported to be ready for use in hat manufacturing field—New process of making tin plate (half nickel and half tin) reported by Standard Steel Spring Co.

LIBRA

September

National defense and progress in development of synthetic materials vitally necessary to U. S. in event of war keynotes 100th A. C. S. meeting at Detroit—Per K. Frolich, Standard of New Jersey researcher, discusses "Butyl" rubber and general progress made in development of various synthetic rubbers—Proposal is made to buy large quantities of Chilean nitrate rather than to increase unduly existing and already planned plants for nitrogen fixation—New melamine-urea-alkyd resins reported likely to revolutionize baking enamel finishes field—Chemical industry concerned over ruling that technical men will not be totally exempted from draft but can only obtain "deferment" rating—Emery Industries celebrates 100 years of service—Another "oldster" is Michigan Alkali, celebrating 50th birthday—Captain John B. Ford, father of plate-glass industry in America, at ripe old age of 80 years decided a half century ago that he must have soda ash from sources that he controlled and out of that determination was born Michigan Alkali—Carbide announces production of maleic anhydride—Du Pont substantially reduces quotations on hydrogen peroxide and sodium peroxide—Cyanamid announces commercial production of potassium sodium ferricyanide, freeing industry from dependence on imported red prussiate of potash—Thiourea is another new commercial product with Cyanamid—C. C. Smith, vice-president, Potash Company of America, retires—J. V. N. Dorr selected as '41 Perkin Medalist—A. C. S. and A. I. Ch. E. announce plans for cooperating with The National Resources Planning Board and the Civil Service Commission in preparing a National Roster of scientific and specialized personnel. In charge of preparation of roster is Dr. Leonard Carmichael, president, Tufts College—Chas. Pfizer & Co. announces $1,000,0000 building program for Brooklyn plant—Lewis H. Marks elected executive vice-president, Publicker Commercial Alcohol—Pacific Coast

Borax is still another company celebrating 50 years of service—Death takes Oscar L. Biebinger, Mallinckrodt Chemical president, in his 80th year—James F. Norris, M. I. T., professor of organic chemistry, dies at the age of 69—Owens-Illinois announces "Duraglas," new glass material resulting in stronger and more durable containers—Much confusion continues in Washington in defense program plans—Sharp industrial upturn in industrial activity materially increases demand for chemicals—Selling agency of Joseph Turner & Co. for Oldbury Electro-Chemical's products to terminate at close of '40 by mutual agreement—Mathieson Alkali building $400,000 addition to Niagara Falls plant to make sodium chlorite—Dr. Gustav Egloff awarded Chanute Medal by Western Society of Engineers—U. S. Appeals Court rules that Gilbert Spruance infringed upon reissue patent No. 19,967 covering lacquers containing nitrocellulose and a resin made from rosin and maleic anhydride and glycerol, assigned to Ellis-Foster Co., thus upholding decision of lower court—Du Pont introduces new high-boiling anti-freeze, "Zerex," based on ethylene glycol—Production of aluminum for national defense begins at Vancouver, Wash., with power from Bonneville Dam—Workers in chemical industry meet in Akron, Ohio, to form International Council under the A. F. of L.—H. A. Bradley, Akron, elected president—New group condemns subversive policies against "democratic unionism or a democratic society."

October

Durez Plastics & Chemicals releases details of its new phenol plant employing Raschig Process invented in Germany—Research Advisory Service (formed by Bert H. White, Liberty Bank of Buffalo) releases answers received from business men to question—"What New Product, Process or Material Might Industrial Research Develop That Would Be Valuable To Your Industry?"—Cyanamid's H. L. Derby is principal speaker at annual meeting of American Association of Textile Colorists & Chemists—William H. Bower retires after 54 years of service with Henry Bower Chemical Manufacturing Co.; is succeeded in presidency by Henry Bower—Benjamin G. Symon named manager Shell Oil's technical products east of Rockies—Monsanto names Thornton C. Jesdale manager New England sales of organic chemicals and phosphates—Glyco Products plans new Brooklyn plant—CHEMICAL INDUSTRIES publishes first pictures of interior of American Potash & Chemical's new Trona bromine plant—Du Pont reports large-scale commercial production of adipic acid—Paint associations hold most successful meeting in history in Washington—Revised standards for coal tar and cresylic disinfectants, recommended by N. A. I. D. M., now promulgated to industry by National Bureau of Standards—New specifications for heavy duty finishes on floors released by Maple Flooring Manufacturers Association—Michigan Alkali celebrates its golden jubilee Oct. 17, with banquet in honor of 567 veteran employees—Whole chemical industry attacks H. R. 10607 which would amend an act of 1917 controlling explosives and "ingredients"—Proposed measure specifically names important industrial chemicals and would require licenses to make, sell or possess more than one ounce in time of war and/or emergency—Industry also shocked by announcement that new synthetic ammonia plant will be built at Muscle Shoals by T. V. A.—See government competition with private industry after present defense emergency ends—Dr. Linus Pauling, California Institute of Technology, announced as '41 Nichols Medalist—Walter D. Merrill, Joseph Turner & Co., nominated for '41 presidency, Salesmen's Association of the American Chemical Industry—Two hundred representatives of Dow Chemical attend four day sales conclave at Midland—Aluminum Co. of America states it is spending $150,000,000 on expansion to meet defense requirements—Humble Oil to build $12,000,000 toluol plant at Baytown, Tex.—Deaths include John Anderson, 83, board chairman, Chas. Pfizer & Co., and Russell Kent, 55, Washington editor, CHEMICAL INDUSTRIES—Monsanto sends Harvey M. Harker to conduct sales survey of Australia and neighboring islands—Chemical shipments in October top September total which previously was largest month in '40—Chemical producers on most items extend '40 prices into first quarter of '41—Contract season decidedly a "seller's market," but manufacturers assure all consumers that legitimate needs will be taken care of—Howard Nieman, secretary, American Institute of Chemists, honored at dinner by N. Y. Chapter—Du Pont to erect second nylon yarn plant with location at Martinsville, Va., cost estimated at $11,000,000—Arrangements for synthetic rubber contracts being negotiated by the Rubber Reserve Co., subsidiary of the R. F. C.—Presidential executive order late in month sets up formal machinery for government priorities; Donald M. Nelson named priorities administrator—R. F. C. subsidiary, Metals Reserve Corp., is purchasing stocks of strategic manganese—Politics said to be influencing selection of certain defense plant sites—Lack of coordination seen hurting defense program—Dr. Edward Bartow becomes associated with Johns-Manville research—L. A. Smith, who joined Penn Salt in 1896, elected vice-president and treasurer.

November

CHEMICAL INDUSTRIES in its National Chemical Exposition Number (largest issue ever published) supplies technical and commercial data on over 500 new chemicals developed by "C. I." advertisers in past three years—Carbide lowers prices on morpholine—Commercial Solvents announces commercial production of 2-amino-2-methyl-1-propanol—Koppers advertises impressive list of new interesting coal tar derivatives available in commercial and semi-commercial quantities—Prof. Arthur W. Hixon named head of Columbia University's chemical engineering department—Indictments charging six producers with conspiracy to fix prices on nitrates released in U. S. Federal Court; vigorous fight forecast—Dies Committee releases "White Paper" charging that German agents in South America are being supplied with American chemicals to maintain their grip on Latin American markets—H. L. Derby, Cyanamid, denies sabotage cause of explosions in three of company's plants—Calco places in operation $500,000 effluent treatment plant at Bound Brook, N. J.—Shell Oil announces plans for construction of new process solvent extraction plant at Wood River Refinery, first of its kind in Middle West—R. K. Shirley elected vice-president and treasurer, Freeport Sulphur—Reilly Tar & Chemical reports new method of producing acridine in commercial quantities; product is essential in manufacture of atebrin, a quinine substitute—Du Pont now producing normal octanol and normal decanol in commercial quantities—It is now the Columbia Chemical Division of Pittsburgh Plate Glass Co.—November chemical shipments top the October record totals as the defense plans begin to make themselves felt in substantial increases in productive activity in varied lines—A. F. Payne named general sales manager Sherwood Petroleum—John M. Spangler named general sales manager, National Carbon—John R. Toohy, Squibb, named chairman of the Drug & Chemical Section, N. Y. Board of Trade—Sites for 15 government defense plants (ammunition loading, smokeless powder, bag loading, TNT-DNT, ammonia, ammonium nitrate, toluol, etc.) officially announced.

December

First National Chemical Exposition, sponsored by the Chicago Section of the A. C. S., and held in Stevens Hotel, Dec. 11-15, an outstanding success—CHEMICAL INDUSTRIES displays "New Chemicals for Industry"—over 500 new chemicals developed by its advertisers in past three years—Dr. Marston T. Bogert, Columbia, is dinner speaker at annual S. O. C. M. A. meeting. August Merz, Calco, reelected president of the association—National Association of Manufacturers discuss defense problems at annual meeting at Waldorf in N. Y. City, Dec.

(Continued on page 64)

Bellanca "Cruisaire" resin bonded plane.

SYNTHETIC RESINS

In Modern Airplane Construction

By H. N. Haut, ***Chief Inspector, Bellanca Aircraft Corp.***

An Outstanding Authority Discusses the Widening Applications of Various Plastics In Modern Aircraft Production Methods.*

IT IS undoubtedly true that synthetic resins are playing an increasingly important role in airplane construction.

To those of us who have closely followed the trends of research, both abroad and at home, the gradual but nevertheless positive extension of the resins into the realm of airplane structures appears as a natural outgrowth of this research.

To others, the plastic airplane is some mysterious catchword which gives rise to the vision of a sorcerer pouring his liquid into a mold, or his powder into a mammoth press and at the touch of a switch, we have the plastic airplane.

These visions may be enhanced by persistent rumors of the installation of huge presses of 12,000-ton capacity in various plants in Nazi Germany and by eyewitness reports of large quantities of relatively large molded sections of airplane structures in German plants.

Rumors of this nature no doubt have some foundation in fact, since further reports of fallen German aircraft indicate the structural use of plastic materials; not in any mysterious fashion, but as a logical extension of investigations already reported in the literature.

From an engineering point of view, synthetic resins in airplane construction may fall roughly into three categories. In the reverse order of their importance, they are:

1. Those which are used for decorative or utilitarian purposes only, and which are not considered indispensable.

2. Those which play a secondary part in the structure of the airplane and which are now considered indispensable because of the savings in weight, cost and efficiency over the materials for which they have been substituted.

3. The third and most important group includes those which form or aid in forming the primary structure, upon which depends the structural integrity of the airplane.

It can hardly be said that airplane applications of synthetic resins are restricted to any class of resins, or any particular method of fabrication. They run the entire gamut of thermoplastic and heat reactive materials and include castings, moldings and laminated products as well as liquid resins and powdered materials for adhesive purposes. Again, in a class by themselves, are the resinous bases for paints, varnishes and lacquers.

Our first group of decorative and utilitarian resins has rather closely followed the automobile industry. Our throttle knobs, buttons, handles and name plates have taken their forms from cast, molded and laminated resins, while our electrical switch panels and junction boxes have availed themselves of the strength and dielectric properties of the laminated materials.

Accessory manufacturers have found economy, weight saving and perfect interchangeability in the fabrication of instruments, and important magneto parts. Even our all-metal propellers have been embellished by parts of synthetic resin in their vital hubs.

With the increase in popularity of the lower-priced commercial airplanes, standards of luxury and eye-appeal are on the rise, and the use of plastics in this field may be expected to increase

The second, and far more important group than the first to the engineer and designer, is represented by the plastics which do carry loads of a secondary nature and which do effect economies in weight or efficiency.

An outstanding example is the thermoplastic, water clear sheet resin from which our windows, windshields, machine gun turrets and the like are made. Consider the specific gravity of glass of 2.6 as compared to the 1.18 of a methyl methacrylate resin, keeping in mind that the efficiency of an airplane is measured by its weight, and it is an easy matter to evaluate the contribution of this material.

* Paper delivered at Plastics Symposium at Lehigh University late in October of last year.

Add to this a high order of workability in the formation of shapes and compound curves so necessary to efficient airplane design, and we have in our hands a well nigh indispensable material used as standard equipment on all military and commercial airplanes, with the exception, perhaps, of those in the very low cost brackets where price is the vital consideration. In these we still find the cellulose based transparent sheets of much lower clarity and permanence.

Throughout the control system of the modern airplane, we find control cable pulleys, cable fairleads and chafing strips of the laminated phenolic materials, made by impregnating sheets of canvas or other fabrics with phenolic resin and subjecting superimposed layers to the necessary heat and pressure.

The resulting material is strong, tough and wear resistant, yet not sufficiently so as to cause premature wear in the metal faying surfaces.

Further uses of a structural nature have been made of the fabric reinforced resin and they will be discussed a little more fully.

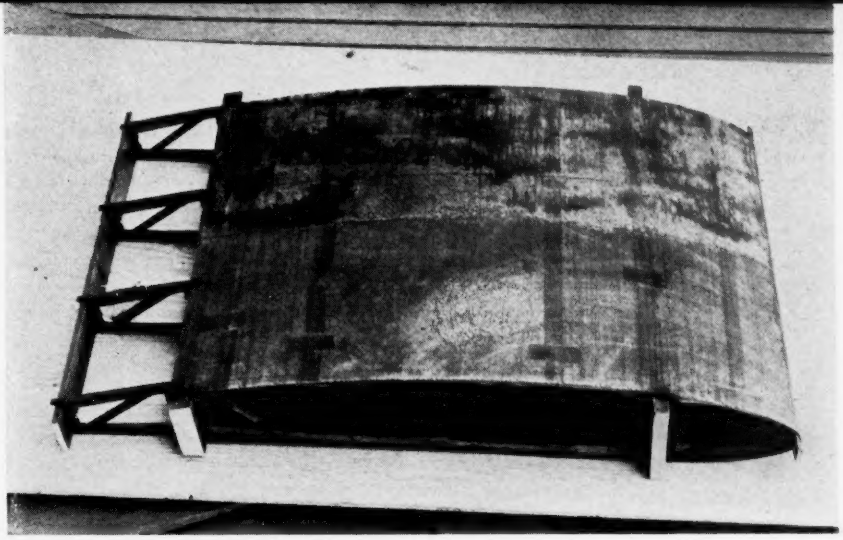
The foregoing has been a superficial resume of some of the uses of synthetic resins in airplane construction, since it is obvious that a detailed discussion would carry far beyond the limits of this paper.

The principal interest of engineers and manufacturers of aircraft today, especially in the light of the present National Defense Program, is the structural application of plastics. The importance of any developments which will increase production, improve the product, reduce costs or weight, or reduce the percentage of highly skilled labor required, can hardly be overemphasized, and it is undeniable that these advantages go hand in hand with plastics.

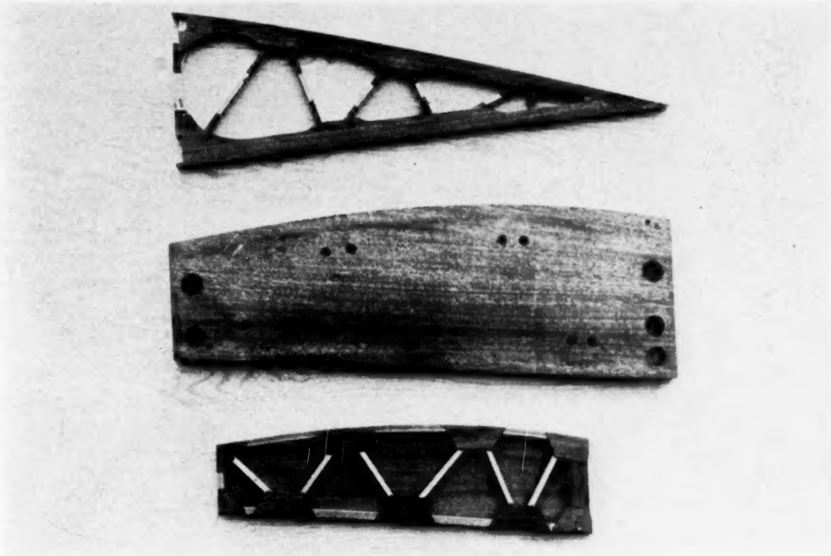
Investigating Plastics

Most progressive manufacturers are either investigating the possibilities of applying plastics to their product or are keenly on the lookout for favorable signs of progress. Investigations are taking the form of actual construction of component parts, varying in importance from elevator tabs and bomb bay doors, to complete wing and fuselage structures. Again the types of resins are unrestricted, covering a variety of both thermoplastic and thermosetting resins, as well as a number of fabricating processes. It is a notable and healthy sign that most of the work is being done in close collaboration with competitive resin manufacturers, for only with their intimate knowledge of the behavior of the resins, can true progress be made by the airplane manufacturer.

In order to fully comprehend the progress to date and the definite trends in plastics construction, we must review briefly the research work and literature and examine the properties of the resins as an aircraft material.



Test wing panel bonded with low temperature phenolic resin after one year on roof. Similar panels with other adhesives failed.



Typical rib construction—phenolic resin bonded.

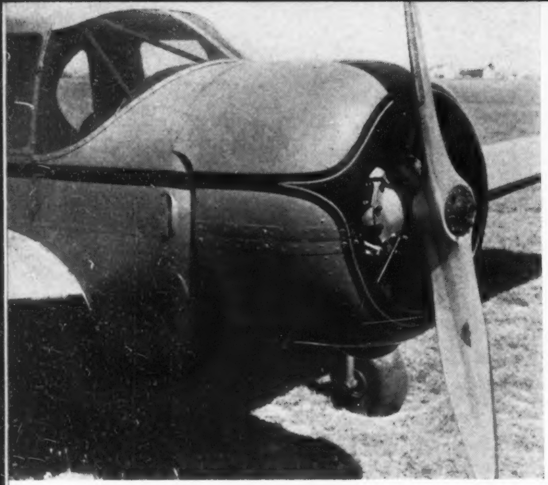
At the outset, it was recognized that the pure synthetic resins lack the strength, toughness and resilience to be applied as structural materials as they are, and it was obvious that a reinforcing medium was needed. Moreover, it was recognized that the reinforcement could not be introduced as a filler of flour or macerated canvas, or as an alloy in metals since the amorphous character of the material could hardly be improved that way.

De Bruyne (1) worked primarily with long reinforcing fibres, such as cotton, silk, flax and hemp, by packing the fibres tightly together and using just enough phenolic resin to fuse them together. By this method, tensile strengths of well over 100,000 lbs. per square inch were obtained with specific gravities not exceeding 1.55. He also found that by applying an initial load to the fibres during the molding operation, the modulus of elasticity could be substantially increased. If we use as an index of structural efficiency the ratios of strength over specific gravity and elastic modulus over specific gravity, it is seen that the tensile efficiency far exceeds that of the metals and wood. However, this type of construction has no appreciable effect on the compressive strength, which increases but little over the pure resin. Obviously then the use of this material was seriously limited. Other investigators, notably Reichers (2) reported similar results with other vegetable fibres.

The conventional fabric reinforced laminated material, previously mentioned has found a variety of uses in aircraft, but structurally is characterized by a low modulus of elasticity compared with other materials and this lack of stiffness has been the primary obstacle to its structural use.

As early as 1924, propellers molded from tough, strong materials of this nature were actually built and flown, but have since faded from the market. It is suspected that the lack of stiffness may have been a contributing cause.

Although the persistently low modulus of elasticity may have impeded its progress structurally, its other virtues of toughness, strength and water resistance have made it a very desirable product, so much so that it has recently appeared as a completed formed sub-control surface of



Plastic (methyl methacrylate) windshield and window on Bellanca "Cruisaire."

approximately one square foot area, and by now is probably in production on one of our well known airplanes.

Probably the most significant of the early developmental work has been in connection with the use of wood as a reinforcement for the plastics. It is a paradox that the bulk of the literature and earlier experimental work comes from Europe, notably England and Germany, who find it necessary to import a large part of their wood requirements.

Kraemer (3) and King (4) have reported on the properties of wood reinforced resins and subsequent work in this country confirms, to a great extent, their findings.

The basis of the unusual affinities these materials have for each other lies firstly in the disparity between the tensile and compressive strength which is a characteristic of wood, and the inverse difference in the resins. Sitka spruce, for example, is much higher in tensile than compressive strength and a phenolic resin on the other hand is much stronger in compression than tension. Obviously a combination of the two should result in vastly improved and more nearly balanced properties. And so it does. The improvement is further enhanced by the natural adhesive properties of the resin.

Combining Wood, Resin

The combining of wood and resin to produce the improved product is ordinarily accomplished in one of two ways, either by simply laminating the thin veneers with a resin adhesive of the liquid or film type, under heat and pressure, or by first impregnating the veneers with resin by soaking, vacuum or pressure methods and then applying the necessary heat and pressure to complete the polymerization cycle of the resin. In either case, the increase in strength is accompanied by an increase in density. It is noteworthy that the increase in density is influenced by both the pressure employed and by the percentage of resin in the construction, the resin having a higher density than the wood. A study of reports (5) on these various constructions indicates that the density increase which is due primarily to pressure increases the tensile strength at a greater rate than the compressive strength, while the density increase due to the higher resin percentage increases the compressive strength at a greater rate. It is obvious, then, that by suitable manipulation of the variables, a wide variety of physical properties and densities may be had within the limits of the material.

A specific example would be the values reported by Tiltman (5) and Ellison (5) of birch laminations impregnated and compressed to a specific gravity of 1.0. The construction yielded a tensile of 22,000 lb. per square inch and a compressive strength of 21,000 lbs. per square inch.

Bernhard (5), Perry (5) and Stern (5) on the other hand laminated and compressed birch specimens to a specific gravity of 1.05 without impregnation with a resulting tensile of 19,000 lbs. per square inch and compression strength of only 11,700.

Another variation of this process is the differential impregnation of wood in which the density of the board is varied from one end to the other by progressively restricting the amount of resin absorbed.

Differential Impregnation

The advantages of differential impregnation have already been exploited in Europe in the fabrication of propellers, the particular benefit residing in the characteristic stress distribution along the blade. Extremely high stresses are encountered at the hub section, tapering off to zero at the tip and any excess weight especially near the tip is magnified by centrifugal force and translated into higher stresses at the hub.

Efforts to obtain these differential materials from manufacturers in this country have thus far proved fruitless, but some progress has nevertheless been made by using the highly densified wood at the hub section and splicing to it wood of a lower density, with heat reactive synthetic resin adhesives.

Complete descriptions of the working characteristics and physical properties of the laminated and impregnated materials may be found in the literature (4) (5) accompanied by comparisons with more conventional structural materials and discussions of their relative merits in airplane structures, but comparatively little of it has actually been used.

It might be well at this time to say a word about resin bonded plywood for it has probably contributed more to the realization of the value of plastics in aircraft than any single factor.

Before the advent of resin bonding, plywood had never been a favored material with aircraft designers, principally because of its indeterminate strength, which with the animal adhesives, varied with the vagaries of the weather, so to speak, and delaminated in the humidities of our own temperate climate. The introduction of casein glue and its subsequent improvements added to the reliability and water resistance, but not sufficiently so to merit the structural confidence of engineers, especially where tropical exposures were to be considered, and casein glued joints of the day were generously reinforced with nails and profusely protected by surface coatings.

The resin bond in plywood, which definitely fixed its reliability, reawakened the interest of the wood-minded engineers, with the subsequent and ever increasing appearance of plywood structures. The long time exposure tests by Brous (7) covering a period of four years at our Forest Products Laboratories went far to establish the durability, water-resistance and resistance of parasitic growths, of the phenolic bond.

The desirability of using plywood in place of metal in certain applications is best illustrated by examining a typical stressed skin wing or a typical monoque fuselage of metal. It is seen that even the most ingenious design cannot avail itself of the full compressive strength of the metal, but fails by local buckling before the ultimate metal strength is reached. We therefor find a variety of stiffeners, in the form of angles, channels and corrugations, used to support the unstable skin. They must also be rigidly attached to the skin with closely spaced rivets and with a corresponding increase in the drag of the surface.

Now Clark (6) has shown that for a given weight, a thicker shell or lower density material without stiffeners will support a greater stress than a metal shell with stiffeners, and upon this thesis is founded one of the plastic airplanes of today. Add to these findings and to the research already discussed, a continued improvement in the technique of forming compound curves of plastics reinforced wood, and a utilization of the plastic properties of the plastics, that is, its susceptibility to forming and to remain formed, (I refer now to the irreversible thermosetting resins) and we have, by a natural succession of events, arrived at the plastic airplane.

There has appeared in the literature, descriptions of three plastic airplanes. Essentially all three are based on plastics bonded or plastics reinforced wood. True to tradition, one is reported to use a thermoplastic resin of the butecite type, one a phenolic resin and the third a urea formaldehyde resin.

Butecite Resin Construction

Briefly, the one using the butecite resin is constructed by impregnating or soaking thin veneers and by tightly winding them

around mandrels or forms, the number of layers determining the strength of that portion of the structure. The mandrels and forms are then assembled and bound together by additional veneers so as to form the skin and bind it to the component parts, in such a way as to make the mandrels removable after the heat treatment.

Upon completion, the entire assembly is encased in a rubber bag from which the air is exhausted and it is then placed in an autoclave and exposed to about 80 or 90 lbs. of steam pressure until the impregnated veneers are fused together. The mandrels and the outer surface of the structure must necessarily be treated to prevent the adhesion of the resin.

The second is reportedly constructed by laying carefully fitted veneers, prepared with a liquid phenolic resin, on a male form and by subjecting them to mechanical pressure and simultaneous heat, while the third is prepared on a male form with a liquid urea resin and is then encased in the rubber bag followed by the autoclave treatment.

The exact processes and methods of control of impregnation, pressures and densities are rather closely guarded manufacturers' secrets.

To date, none of the above airplanes have appeared on a production scale, and it is assumed that the usual problems of production, designs and perhaps costs need to be overcome first.

The conception of plastics and the uses of plastics in airplane structures do not entirely revolve around the molded structures. There is another, more conservative school of thought which bases its design on the utilization of natural wood where efficiency of design, ease of manufacture and sustained supply indicate, and of prefabricated resin bonded and resin reinforced products, plywood, of course, being the most common.

The use of wood and glue in aircraft manufacture is as old as the industry itself. As a structural material its value is undisputed. High strength-weight ratio, high resilience, corrosion resistance, ease and rapidity of fabrication on high speed machinery and the like, are all characteristics associated with wood.

In the important matter of joint efficiency, wood again claims an advantage over the other materials. The most perfect weld in a steel structure anneals and reduces the strength of the base metal adjacent to the weld. The rivet demands the sacrifice of rivet holes. Even the spot weld converts its area of wrought base metal to a casting with consequent reduction in strength, while the glued joint does not require such sacrifices.

This optimistic picture, however, is not without its blemishes, since it must be recognized that the many advantages of wood have been offset to a great extent by the lack of permanent dependable joints in component parts. The great majority of failures were observed to be not in the wood itself, but in the joints.

Exposure tests conducted by Brouse at the Forest Products Laboratories have substantiated that joint failures with animal, vegetable and casein glues could be attributed primarily to a chemical hydrolysis of the glue, a decomposition by parasitic micro-organism or a mechanical failure due to stresses developed in the wood, the latter being particularly serious if the glue is in a softened condition.

It had already been demonstrated that certain resin adhesives could resist water at elevated temperatures indefinitely, and were completely immune to the destructive micro-organisms. At the same time, they resisted chemical hydrolysis, and were much stronger than the common glues.

But these resin adhesives were used in hot presses at temperatures between about 250′ and 325′ F. and it was clearly impractical to hot press an assembled wing panel.

The apparent need was then a cold setting resin adhesive.

After some three years of intensive work through the vinyl and butecite resins in the thermoplastic class and the urea and phenol formaldehyde resins in the thermosetting class, two formulations based on a phenolic resin of high molecular ratio were finally evolved at the Bellanca Aircraft Corporation.

The trail of research led back to the elementary mechanics of gluing, and to the study of the microstructure of wood. The problems of non-uniform absorption and joint starvation were eventually overcome and a satisfactory control was established over a delicate chemical reaction, with the invaluable help of the Catalin Corporation.

The ideal of the strictly cold-setting resin has not yet been achieved. The writer has tested any number of cold-setting preparations, and it may be taken as an axiom that the uniformity of the synthetic resin bond is only as good as the uniformity of the temperature, and the dependability of the bond goes down with the temperature.

The formulae were therefor developed to effect a cure of the resin at 140′ for a length of time compatible with production requirements.

The problem of maintaining a large insulated room at a temperature of 140′ involved no special difficulties and the humidity was readily controlled to maintain stability in the wood at that temperature.

The formulations mentioned have been extensively tested and evidence has been presented to show that they will produce uniform, dependable joints of typical phenolic resin performance, or any of the species of wood commonly used in aircraft manufacture, while the mixing, handling, spreading and clamping properties are almost identical with those of casein glue.

A long series of comparative tests have definitely shown the superiority of the low temperature phenolic resin over the bonding mediums commonly used in airplane assemblies.

Shearing tests of dry joints in the soft woods such as spruce and bass gave no particular advantage to the resin, since the casein joints gave just as high a percentage of wood failure with comparable shear strengths. The superior mechanical strength of the resin was shown in the shear tests of the hardwoods, typified by birch and maple. Where the average shear value was 2,778 lbs. per square inch for the resin as compared to 1,732 lbs. per square inch for casein glue. The specimens were of birch and the lowest percentage of wood failure was 80 for the resin as compared to 5 for the casein.

In addition to cold water immersion, a boiling test was arranged consisting of a cycle of three periods, 8 hours of boiling water, 8 hours of cold water and 8 hours of drying. The cycle was continued for 200 hours, after which the specimens were manually destroyed. No evidence of joint failure could be found.

Another four foot panel of typical wing construction was immersed in a tank of boiling water for a day after which it was oven baked to develop violent shrinkage stresses. Subsequent examination showed that the resin bond had successfully resisted the stresses, while similar panels with other adhesives completely disintegrated in the boiling water after only a few hours' immersion.

With the rapid growth of both plastics and airplane industries, it is difficult to foretell their exact future relationships, but we may safely predict that the synthetic resins will increasingly continue to infiltrate the airplane structures and their use will be associated with wood. As a reinforcement for the new prefabricated structural materials, as a reinforcement, binder and surfacer in the molded units, and as a bonding agent in the structures of wood prefabricated materials.

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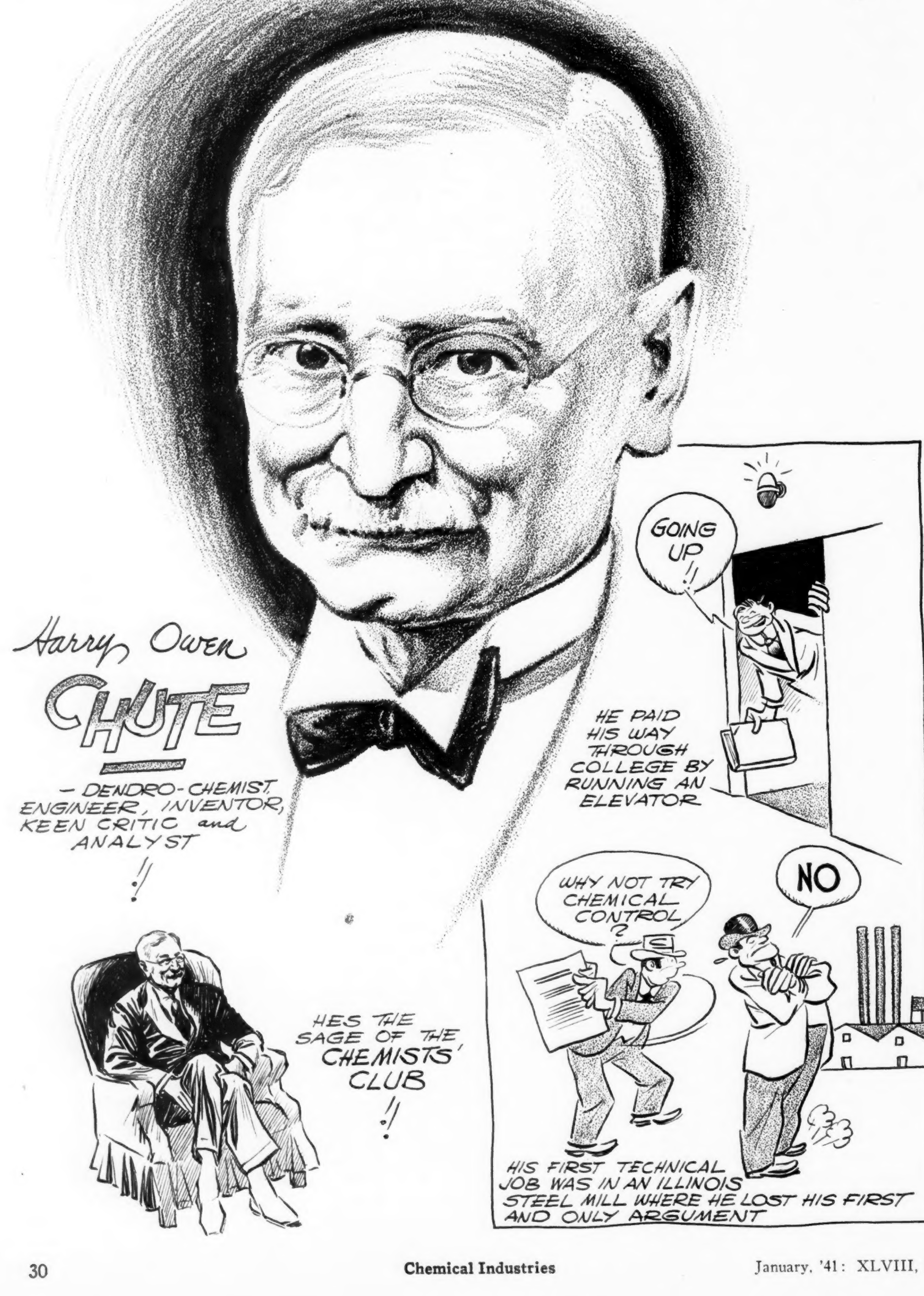
Personalities in Chemistry



HARRY OWEN CHUTE

By

A. D. McFadyen

DENDRO-CHEMIST, engineer, inventor, keen critic, outspoken analyst, arbiter of The Chemists' Club Round Table, one of the outstanding personalities of the chemical profession—such is the make-up of Harry Owen Chute.

Known to most as "H. O.", he was born in Pigeon Creek Township, Vandenberg County, Indiana, in the middle 60's, and was orphaned at an early age. He is truly a self-made man by any standard. He pursued his studies at Columbian (now George Washington) University in Washington, paying his way through the night session by running an elevator during the day and pumping the organ in a Cherrydale, Virginia, church, where he also took the collection, kept the preacher posted on the Bible and, it is reported, occasionally did a little preaching. This latter proclivity he dropped early in life, having found that the average individual was quite capable of looking after his own morals and minor vices.

Few men can lay claim to having revolutionized a century-old industry. Fewer yet have had the honor and privilege of seeing their contributions to science or industry characterized as "brilliant common sense" by their peers. And Chute is one of them. His life's work has been the improvement of manufacturing techniques,[1] and most everything he has tackled he has solved by reducing the problem to its simplest concept and then applying large doses of common sense—the brilliant variety. It is no wonder that he has left his mark in every field in which he has been active in more than fifty years of engineering practice. The steel industry,[2] the art of distillation,[3] rubber vulcanization and reclaiming,[4] waste utilization,[5] the wood chemicals industry,[6] all of these have drawn his interest and benefitted thereby. Curiously, some of his inventions of thirty to forty years ago are still in use, which in itself is evidence of Chute's advanced thinking and technical competence.

Chute's first "technical" job was in an Illinois steel mill, where he tried (unsuccessfully) to introduce chemical control. The superintendent was adamant, and it has been recorded that this was the first and only argument that Chute ever lost. During the 90's he was in the mining field in the Black Hills and had many amusing experiences. It wasn't until the turn of the century that he devoted his inventive genius to improvements in the chemical arts.

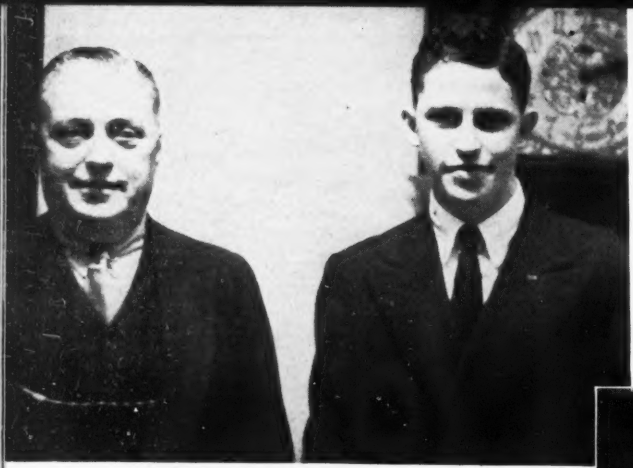
At that time the art of making "80 per cent. miscible" wood alcohol consisted of distilling crude alcohol to 80 per cent. and then diluting with water and redistilling five or more times to separate tar. Chute revamped this cumbersome and costly procedure by the simple expedient of distilling the crude to about 20 per cent., settling, adding lime, and then distilling to "80 per cent. miscible" in a single distillation.[7] It was also current practice to distill crude pyroligneous acid to separate tar, neutralize the distillate, and evaporate to dryness to produce gray acetate of lime. Chute saw the possibility of combining these two processes and thereby carrying them out with one and the same lot of steam.[8] In those days the idea of reducing steam consumption by using less of it was considered plausible but impractical, and Chute had a hard time convincing the industry and selling his idea.

At long last he succeeded in interesting Berry Brothers of Cleveland, and with the financial backing of George F. Ahlers of Cincinnati, the first installation was made. It was guaranteed to reduce the steam consumption by at least 80 per cent., with the understanding that the installation would be rejected if it failed to show such a saving. The plant proved an outstanding success, the consumption of steam being reduced to less than 20 per cent. by the conjoint manufacture of "80 per cent. miscible" and gray acetate. Chute added certain refinements in equipment design, including a rectifying column provided with a hand-hole on each plate to permit scraping of tar from the plates. Many of these installations were then put in service with equally satisfactory results. The last one did not have Chute's blessing and had its day in court, where it was held that his patents were valid and infringed. The court's decision[9] established certain precedents in chemical cases and is widely cited and quoted in the course of present-day litigation. This explains why Chute, on being asked by a newly met young chemist whether he knew something about patent law, replied: "Hell, yes; I've made it!" Chute's work for Freiberg & Workum in 1905, again with the financial backing of George Ahlers, stamps him as a pioneer in the production of Wealth from Waste and antedates that of John E. Teeple and others by many years. He designed and installed a concentrating and drying plant to convert distillery slop into cattle feed[10] and keep it out of the river. The feed was superior in nutritive value; so much so, in fact, that its principal market was abroad, where even then feeds were purchased on analysis. The American farmer could not or would not pay what the Germans were paying, so Chute displayed some of his "brilliant common sense" and by the simple expedient of adding ground corn cobs to the slop in the drying operation reduced the nutritive value and provided a feed suitable for the domestic market. Incidentally, he thereby found a way of turning corn cobs into profit, and thus was also an early chemurgist.

(Continued on Page 64)

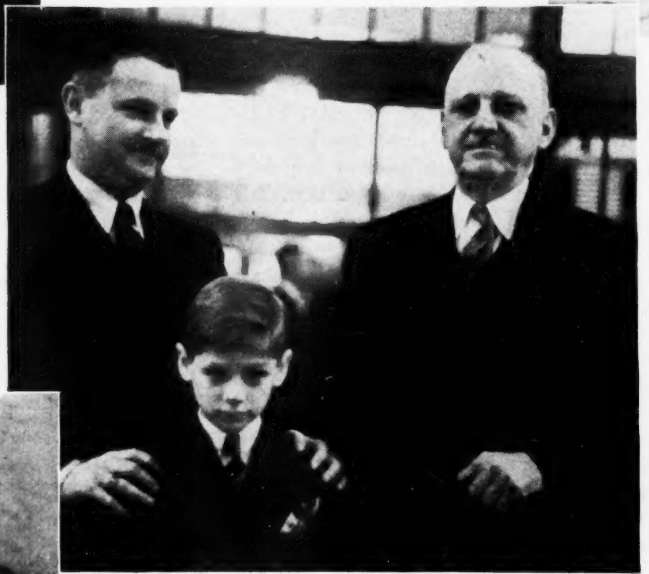
Chemical Industries Goes to a Party

Proud fathers and, we hope, equally proud sons gathered at the Chemists' Club (N. Y.) for second annual luncheon on December 27.

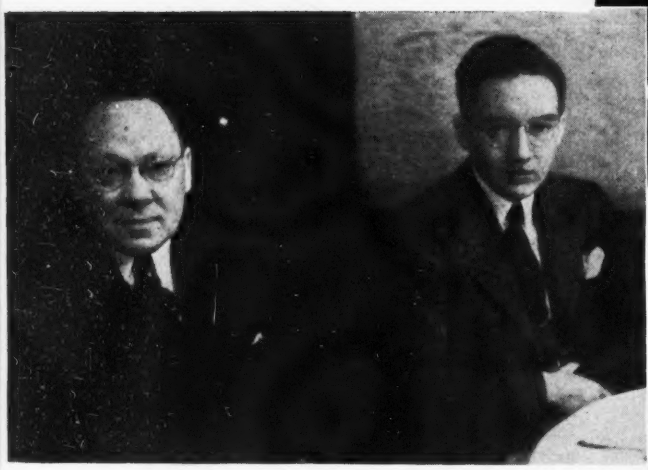


Above, the Klotz's, second and third! John Klotz, 2nd, of Stanco and John Klotz, 3rd, of Harvard.

Above, "Doc" Dorland, Dow Chemical, and Resident Vice-President of the Club (not only a father but a grandfather), introduces luncheon speaker, "Bill" Orchard, Wallace & Tiernan, who spoke on "Your Job and My Job."



Left, three generations of Stiehs, and all with the same name, William M. At the extreme left, William M. Stieh, Woodridge Manufacturing Division, F. W. Berk & Co.



Above, Michigan Alkali's George M. Dunning and George M. Dunning, Jr., St. Paul's School.

Nelson Littell, well-known patent attorney, brought three sons to the party. Left to right, Arthur, in high school, Nelson, Jr., attending Penn State, Nelson Littell (the old man) and Henry, attending Purdue.

"Jack" Hubbell, partner in the chemical consulting firm of Singmaster & Breyer, won first honors with four sons attending but "C. I.'s" candid camera only caught three. Left to right, John, Harvard Medical, "Jack" Hubbell (who pays the bills), Roger, Williams College, Peter, Cornell, and missing in the picture is the youngest, Dick, now in Garden City High.

Mathieson Alkali's "Bob" Quinn and Robert MacLean Quinn of Yale, sophomore year.

"Headliners" In the News

George A. Bryant, executive vice-president and general manager, The Austin Co., has been elected president and general manager, succeeding W. J. Austin who met an untimely death in an airplane accident.

Dr. Harry N. Holmes, head, chemistry department, Oberlin, has been elected A. C. S. president for 1942. He will serve as president-elect during '41.

M. B. Gentry, mining engineer who has been active in mining enterprises in both North and South America, has been elected vice-president, Freeport Sulphur.

A. F. H. Payne has been appointed general sales manager of the Sherwood Petroleum Company. Mr. Payne was formerly with Gulf Oil Corp.

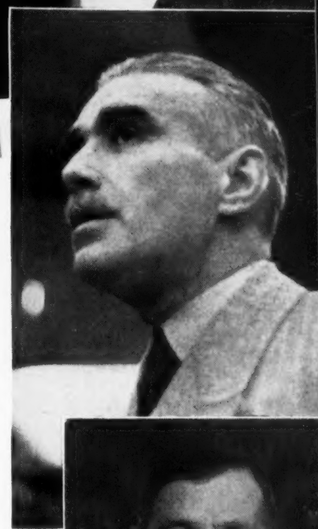
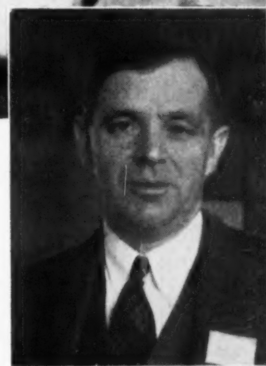
Frederick C. Renner, assistant manager, N. Y. branch, Monsanto, has been promoted to assistant sales manager, Organic Chemicals Division, with headquarters in St. Louis.

Herbert J. Krase, assistant research director and patent attorney for Monsanto's Phosphate Division, has been transferred from Anniston, Ala., plant to Central Research Laboratories at Dayton, Ohio.

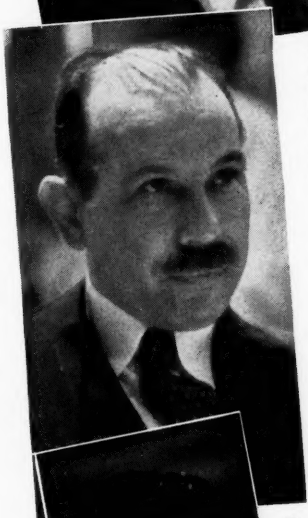
A. I. Ch. E. At New Orleans




From left to right: Dr. Ivan Gubelmann, chemical director, Organic Chemical Dept., Du Pont; Prof. C. S. Williamson, Tulane University, and chairman of the local committee on arrangements; Dr. Otto B. May, general manager, Otto B. May, Inc.; and Prof. O. R. Sweeney, head of the Dept. of Chemical Engineering, Iowa State College.

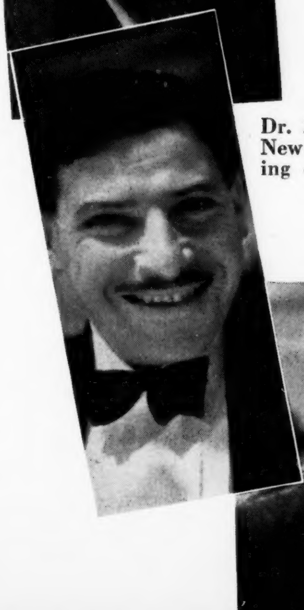
Above, right, Dr. E. C. Williams, who discussed synthetic glycerine, and directly to the right, Harry E. Outcault, charge of Technical Service, Zinc Oxide Department, St. Joseph Lead Co.

Above, Walter Godchaux. Jr., Godchaux Sugar, and member of the local committee; to the left, Prof. J. D. Lindsay, Professor of Chemical Engineering, A. & M. College of Texas.


Center, Adolph Harvitt, vice-president, Magnetic Pigment Co., and Mrs. Harvitt, "snapped" while attending the plant trip to Grande Ecaille sulfur mine of Freeport Sulphur. Below, Dr. Harold R. Murdock, director of research, Champion Paper and Fibre.

Gaston F. DuBois, Monsanto vice-president in charge of research and development.



Dr. Z. G. Deutsch, New York consulting engineer.

Left to right, Dr. Chester L. Knowles, Chemical Sales Director, The Dorr Co., and chairman, N. Y. Chapter of the Institute, chatting with Arthur Linz, Climax Molybdenum Co. To the right, C. W. Scott, Chief Chemist, Southern Kraft Corp., Kenneth H. Klipstein, Manager, Development Department of Calco, and G. H. Clark, Standard Oil Co. of Louisiana, look out over New Orleans from the top of the American Sugar Refinery, located directly on the banks of the great Mississippi.

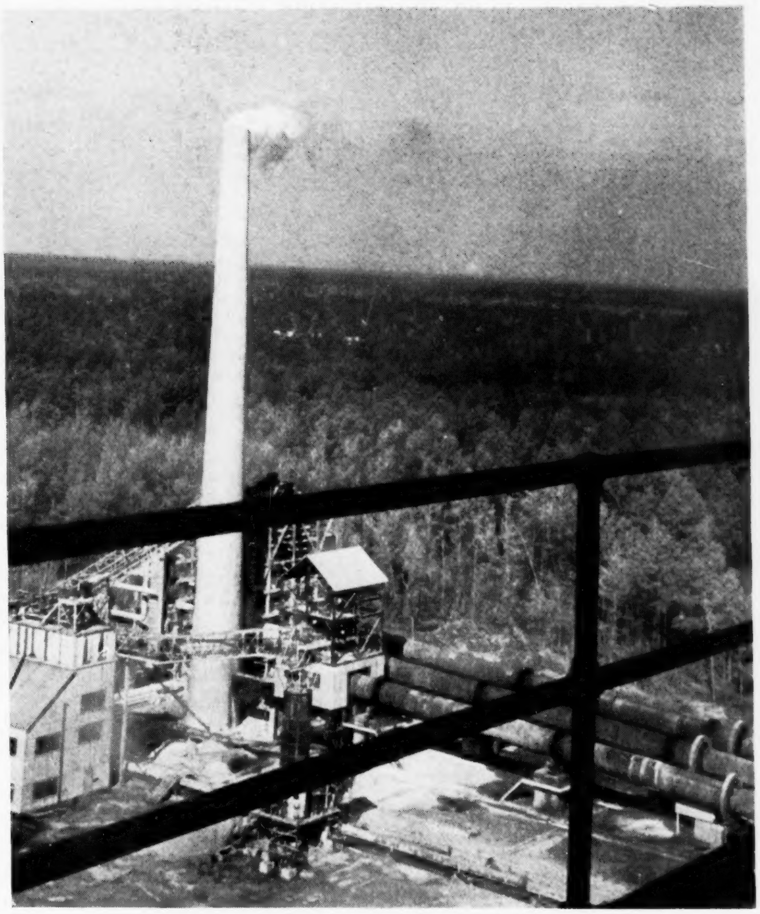

N.P.V. & L. Xmas Party

The paint trade, as usual, turned out en masse for its annual celebration in honor of good ol' Kris Kringle. The party staged at N. Y. City's Biltmore was a gala holiday get-together at which—needless to say—a good time was enjoyed by all.

Below—Enjoying the paint trade dinner are Dr. Robert J. Moore, Bakelite; Dr. Lincoln T. Work, Metal & Thermit; Kenneth J. Howe, Thibaut & Walker; W. R. Catlow, Bakelite; Eliot R. Story, United Color & Pigment Co.; John S. Congleton, Maas & Waldstein Co.; R. Butterfield, Debevoise Paint Co.; A. R. Van Vorst, Aluminum Co. of America; Carl Engelhardt, Brooklyn Varnish Mfg. Co.; Howard R. Moore, Philadelphia Navy Yard.

Below—At the speakers' table, (left to right) A. E. Horn, A. C. Horn Co.; Ralph H. Everett, Keystone Varnish; John A. Murphy, Standard Varnish, and secretary, New York Production Club; H. E. Hendrickson, S. Winterbourne & Co., and secretary, New York P. V. & L. Assn.; C. R. Bragdon, Interchemical Corp., and vice-president, New York Production Club; Thurlow J. Campbell, Valentine & Co.; Preston M. Dunning, Colonial Works, and president, New York Production Club; C. F. Beatty, Socony Paint Products, and president, New York Paint, Varnish & Lacquer Association.

PLANT OPERATION AND MANAGEMENT



Mathieson Alkali Plant, Lake Charles, La.

During the New Orleans Meeting of the American Institute of Chemical Engineers, the editors of CHEMICAL INDUSTRIES journeyed to Lake Charles for an inspection of one of the important alkali plants of the South. Photograph taken from atop the caustic soda building shows a bird's-eye view of part of the lime plant where oyster shells are the raw material.

DIGEST OF NEW METHODS AND EQUIPMENT FOR CHEMICAL MAKERS

SAFE DISPOSAL

Of Empty Containers

By C. L. Jones, *Safety Engineer**

An Empty Chemical Container Is Not Always the Innocent Thing It Appears To Be. The Author Describes the Most Acceptable Practices of Handling Types of Containers Employed In the Chemical Industry.

IT is well always to keep in mind that a so-called "empty" container is probably more dangerous than a full one. This is true of containers which have been used for flammable volatile products; the vapors from small amounts of such materials mixed with air may form explosive mixtures. Also, containers which have been used for corrosive liquids are dangerous, such as unlined drums used for corrosive acids. The acid attacks the metal and hydrogen is formed. All that is then needed is ignition from some source to set off the "bomb." Many persons do not appreciate the potential danger connected with so-called empty containers.

It is our belief that the cleaning and reconditioning of any of the containers or equipment which we are considering should be carried out at a location designed for the purpose. If carried out at other locations, hazardous conditions may be created exposing other persons and employees unnecessarily.

Bottles

A truck transportation company had been instructed to pick up a lot of supposedly empty carboys at a customer plant. Late in the afternoon the driver proceeded to load the empties. However, one of the carboys, all of which had contained nitric acid, had not been completely drained. In placing this carboy on the truck, some of the acid spilled on the driver's clothing. He was not seriously burned but his clothing and shoes were ruined. Only by very good luck did the man escape a serious burn.

It might be argued that the handlers of such containers should wear protective apparel, no one will disagree with the principle. However, all of us will grant that it is too much to expect the drivers and other employees of transportation companies to wear ordinarily such protective apparel.

It is the responsibility of the user to see that the carboy or similar container is thoroughly drained before offering it for transportation or other movement. The draining of carboys is a legal requirement of the Interstate Commerce Commission and the safe handling and disposal of such containers is covered in the Commission's Regulations and amplified in the following Manufacturing Chemists' Association pamphlets:

C-2, "Carboys, Glass-Boxed (I. C. C. 1A) Handling and Storing (When Filled With, or Last Containing, Any Product Authorized For Use Therein)." This pamphlet is intended for the guidance of the consignee.

C-1, "Carboys, Glass-Boxed (I. C. C. 1A) Service Requirements (When Used For Any Product Authorized for Shipment Therein)." This pamphlet is intended for the guidance of shippers.

The Interstate Commerce Commission requires that the white corrosive label be placed on containers used for acids, such as sulfuric, hydrochloric, and nitric. These labels are obtainable from the Bureau of Explosives, 30 Vesey Street, New York City, and must be removed before the empty container is offered for return movement.

In addition, the Manufacturing Chemists' Association recommends the use of their label No. C-5 on carboys containing the above acids excepting nitric and on carboys containing aqua ammonia. This label reads "Contents Dangerous—Before Moving Carboy Be Sure Stopper is Securely Fastened, Etc." These labels may be obtained from the Manufacturing Chemists' Association, Washington, D. C.

On carboys containing nitric acid, the Manufacturing Chemists' Association recommends the use of a special warning label, their Number C-6, which, in addition to listing the precautions found on the C-5 label also cautions the handler to avoid breathing fumes.

In addition, several manufacturers place on carboys containing nitric acid, a label reading "Warning—Nitric Acid—Do Not Breathe Fumes, etc."

In carrying out the work just described or any other work involving exposure to potentially harmful chemicals, protective apparel should be supplied to and worn

* Hercules Powder Company. Paper delivered at last meeting of the National Safety Council, Chemical Section.

by the men doing the work, such protective apparel to include goggles, gloves, boots, and apron and, if the need indicates, respiratory protection.

Drums

The hazard of empty drums can best be illustrated by an accident that occurred at a plant of a chemical manufacturer several years ago.

An empty drum which had contained sulfuric acid was being heated over a forge fire to loosen the drum plug. Evidently, the drum contained hydrogen and the pressure rose until it caused the rupture of the drum. Parts of the drum struck and killed another man working nearby.

It is well known that certain strengths of sulfuric acid, muriatic acids, and others, attack most metals and form hydrogen which has a wide explosive range varying from about 4 per cent. to 80 per cent. This gas is ignited by a relatively low temperature spark. However, in the incident just described, it is probable that the rupture of the drum was due to overpressure from heating and not to ignition of the gas.

Another incident was recently reported to the Manufacturing Chemists' Association. A 12-year-old boy was killed by the explosion of a drum which had previously contained a flammable substance. The boy dropped a lighted match into the empty drum.

To prepare a drum or similar container for mechanical work, re-use, or sale calls for its proper cleaning. Of course, there are many commodities packaged in drums and each requires a specific procedure. However, the drums should first be thoroughly drained and then usually washed out. If the nature of the material is such that mere washing will not properly clean it, then steaming and the addition of some neutralizing agent may be necessary. Mechanical cleaning, using some form of abrasive, may be necessary to remove materials which cannot be removed otherwise.

Washing with water cannot be used in all cases. The person supervising the work should determine the medium which can be used safely.

If the drums have contained a flammable volatile material, the abrasive used within the drum or container should, of course, be non-sparking.

It is frequently necessary to inspect drums both before and after cleaning. For this purpose a low voltage, vapor-proof extension cord lamp should be used. The frame of the lamp should be grounded. It is a matter of record that electrocutions have occurred due to the use of 110-volt ungrounded extension cord lamps for such work. As many drums formerly contained flammable material, it is unsafe to use a bare lamp for inspection as lamp breakage or arcking at the socket could ignite the flammable vapor-air mixture within the container.

Even after supposedly thorough cleaning, a drum may not be safe for welding or other hot work due to the pockets of some flammable material in the chime joint. Therefore, before carrying out welding on such containers, the welder should observe these precautions:

(1) Do not stand facing either end of the drum—stand at the center. The reason for this is that the end seams are generally not strong as the side seam and if the drum does explode, in all probability one or both of the heads will blow out first.

(2) Test the air at both end and side openings for flammability by holding the lighted torch at these openings for a short time. Of course, if there is any sign of firing, the drum should be again cleaned before attempting to carry out the hot work.

(3) In any case, do not reach across a drum in carrying out welding work. In other words, do not expose any part of the body unnecessarily.

While we have a drum cleaning and conditioning problem at some of our own plants, we thought it desirable to discuss the matter with one of the firms which daily reconditions many drums. This firm reconditions drums which have contained almost every conceivable commodity. The average number reconditioned daily is far in excess of 1,000 and they have been in business for more than fifteen years.

To date this firm has had only one serious accident and it was not due to the package. With some containers it is necessary to burn them with torches. Solvent naphtha is the fuel used. Safety cans had been provided for the handling of naphtha about the plant. However, an employee filled a bucket with naphtha ard in so doing spilled some on the leg of his trousers. He then carried the bucket of naphtha to the burning location. As he passed near one of the torches his clothing

Manufacturing Chemists' Association Manuals of Standard and Recommended Practice

M. C. A. Manuals are compiled and written by the various technical committees of the Association, under the direction of the Manual Committee. The manual program is a continuous one, new manuals being released following establishment of need therefor. Manuals are distributed by the Association at approximate cost to member companies and other interested companies or individuals.

Manual Number	
	CARBOYS
C–1	Glass. Service requirements. (For shippers).
C–2	Glass. Handling and storing. (For consignees).
C–3	Glass. Specification of 13 gallon, straight side bottle.
C–4	Stoppers, porous earthware. Specification and testing.
C–5	Warning label. (For all authorized liquids except nitric acid).
C–6	Warning label. (Nitric acid only).
	STEEL DRUMS
D–30	Service requirements. (ICC-5A). (For shippers).
D–31	Handling and storing. (ICC-5A). (For consignees).
D–33	(ICC-5E). Handling and storing of inflammable liquids.
D–37	Warning label. (Acids and other corrosive liquids).
D–38	Warning label. (Inflammable, volatile liquids).
D–39	Warning label. (Aqua ammonia).
	SULFURIC ACID
T–7	Table of physical constants. (O–93.19% H_2SO_4).
T–7A	Table of physical constants. (94–100% H_2SO_4).
	TANK CARS
TC–1	(ICC 103A). Unloading of sulfuric acid, mixed acid & oleum.
TC–2	(ICC 103B). Unloading of muriatic acid.
TC–3	(ICC 103). Unloading of liquid caustic.
D–32	Faucets, metal. Recommended type for the discharge of steel drums.
H–1	Hydrofluoric Acid. Safe handling and discharging of containers.
N–1	Nitrocellulose, wet. Handling of containers in storage or in process.
P–30	Poisons, Class B. (solids). Cleaning out cars after unloading.
S–25	Sodium Bisulfate (niter cake). Handling of box-car shipments.
T–1	Aqua Ammonia. Table of physical constants.
T–3	Hydrochloric Acid. Table of physical constants.
T–5	Nitric Acid. Table of physical constants.
T–9	Zinc Chloride Solutions. Table of physical constants.

C. L. JONES
The Author

caught on fire, resulting in body burns which laid him up for several weeks.

At this point we call your attention to the liability you may incur in selling or otherwise disposing of empty containers not properly cleaned. Should the buyer or his employees be injured as a result of the condition of the container, your company may be called on to defend itself against a suit. It has been our policy that all such containers be cleaned even when a purchaser has offered to sign a release, freeing us from liability.

The following publications contain much useful information: M. C. A. Manual Sheets D-30, D-31, D-37, and H-1. These manuals among other things call for the use of warning labels which can be obtained from the M. C. A. office in Washington, D. C.

Also, the National Safety Council Safe Practices Pamphlets, particularly No. 8, "Handling, Filling, and Cleaning Drums and Barrels," contain much helpful information. Certain manuals issued by the American Petroleum Institute also contain helpful information.

Gas Cylinders

The disposal, that is, the conditioning for re-use, sale, etc., of compressed gas cylinders is a matter which the average user faces very seldom. I think for the purpose of our discussion here we can confine our remarks to the procedure that the average user should follow.

There is a long list of the so-called compressed gases all of which are usually packaged in steel cylinders of various sizes. All such containers must comply with the requirements of the Interstate Commerce Commission.

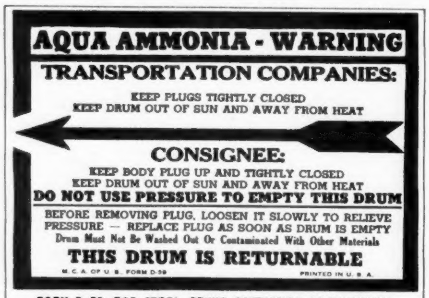
It is not desirable, practical, or necessary for the average user to make any attempt to clean, flush, or do anything else to such containers. If trouble develops, the best thing to do, if the answer is not immediately at hand, is to contact your supplier and ask his advice. Most of the concerns in this field have representation throughout the country with qualified employees who can give expert advice and assistance.

The following simple fundamental rules are those recommended by the Compressed Gas Manufacturers' Association and are taken from their publication, "Safe Handling of Compressed Gases."

"When returning empty cylinders, remove the lower portion of the shipping tag attached to the cylinder. The bill of lading should specify the number of cylinders, consignee, and the fact that the cylinders are empty. A copy of the bill of lading should be sent to the consignee. *Close the valve before shipment.* See that the cylinder valve protective caps and outlet caps, if used, are replaced before shipment."

"Never use cylinders for rollers, supports, or any other purpose than to carry gas."

"Never attempt to repair or alter cylinders or valves."



FORM D-39. FOR STEEL DRUMS CONTAINING AQUA AMMONIA.

FORM D-37. FOR DRUMS CONTAINING SULFURIC, MIXED, OR AQ. HYDROFLUORIC ACID.

FORM D-38-A. FOR NON-RETURNABLE DRUMS CONTAINING INFLAMMABLE VOLATILE SOLVENTS.

Typical Labels recommended by the Manufacturing Chemists' Asociation for use on dangerous articles. For further information address the secretary, Woodward Building, Washington, D. C.

"Never under any circumstances attempt to refill an acetylene cylinder." (This I think should apply to any compressed gas cylinder on account of the possibility of some reaction and the formation of an explosive compound. One possible exception to this is the recharging of CO_2 fire extinguishers using as a source of supply bottles of commercial CO_2. Such recharging is safe if carried out with the proper set-up and control.)

"Before the regulator is removed from a cylinder, close the cylinder valve and release all gas from the regulator."

"As soon as the cylinder is empty and disconnected, the outlet cap, if used, should be immediately replaced on the outlet connection of the valve, in order to prevent damage to the threads on the outlet connection."

"Every precaution should be taken to avoid drawing liquids back into containers as their contents are exhausted. To avoid this, close the valve immediately after the container has been emptied."

Finally, be sure that the cylinder is empty, either by weighing or observation of the gauge.

Our remarks regarding compressed gas cylinders are not very complete and it might be assumed that we do not attach much importance to such packages—just the contrary is the case. However, we believe that the problem having to do with the cleaning, repairing, and reconditioning and "disposal" of such containers is a highly specialized one and not of much practical interest to the average user.

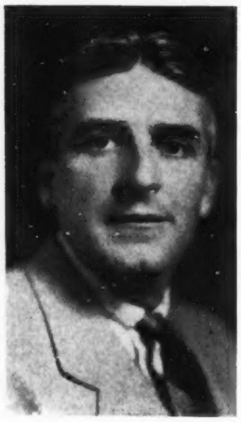
Additional information regarding compressed gas can be obtained from organizations such as the Compressed Gas Manufacturers' Association and the Chlorine Institute, both located in New York City, as well as from the various firms in the field.

Tanks

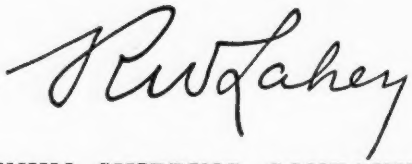
A tank equipped with stirring equipment and used for the making up of a solution containing solvents was to be cleaned in order to change over to another type of material. The vessel was drained but not steamed out, the drive belt removed, and the cover was opened. An employee then went down into the vessel in order to wipe up the residue. He ran out of wiping cloths and sent his helper to get an additional supply. When the helper returned, he found that the man in the tank had collapsed. Assistance was quickly obtained and the man was removed from the vessel promptly. He was carried to fresh air and artificial resuscitation started. In addition, a physician was called. Despite all efforts, it was impossible to revive the man.

The same procedure should be followed with tanks as with other containers—be sure they are cleaned of gases, vapors, or toxic or harmful material before men are

(Continued on page 81)



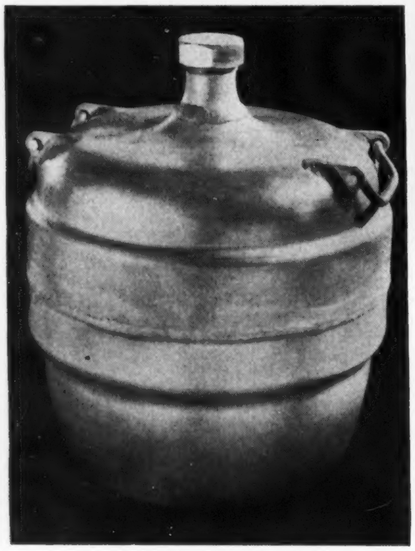
Shipping and Container FORUM

By 

ALUMINUM SHIPPING CONTAINERS FIND WIDE APPLICATION IN CHEMICAL INDUSTRY

DURING the past two years, aluminum shipping containers have gained an increasingly important position in the chemical and allied industries. The combination of characteristics that these containers possess, including light weight, strength and resistance to corrosion has been manifest in reduced shipping costs, durability, and efficiency of use, and protection for a large number of materials—particularly those which present unusual problems in packaging and shipping. Two types of aluminum containers have been approved for certain classifications of dangerous commodities, and the others have been used for non-regulatory products.

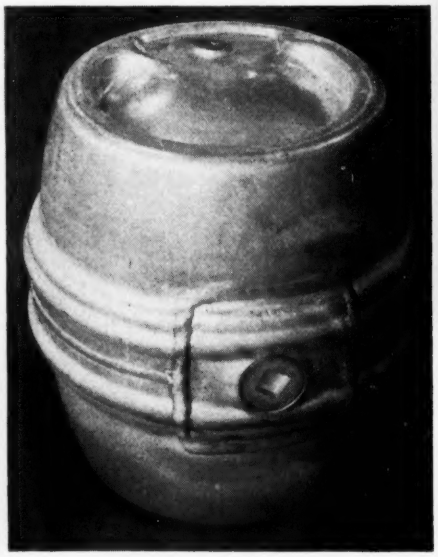
These aluminum alloy containers have been designed, primarily, for use with chemicals, beverages, and other products in liquid form. However, certain of these containers may be adapted for the packaging of some solids. The various types are known as the aluminum carboy, I.C.C. bilge aluminum barrel, bilge barrel for non-regulatory products, straight-side I.C.C. drum, and light-gage aluminum drum.



Aluminum Alloy Carboy

The carboy is designed for capacities of from five to fifteen gallons, and its contours approximate those of the glass carboy except that a flat section is provided on the shoulder to make stacking possible. It is fitted with drop handles and screwed cap closure.

Features of the aluminum carboy include light weight, ease of handling, and elimination of breakage. In the 13-gallon size, for example, the aluminum carboy weighs approximately 16 pounds, whereas the conventional glass carboy of similar capacity, with its wooden protective crate, weighs about 65 pounds. This aluminum container is used for the shipment of non-regulatory materials such as acetic acid, formaldehyde, essential oils, propionic acid, wetting agents, soft drink syrups,



Bilge Aluminum Barrel

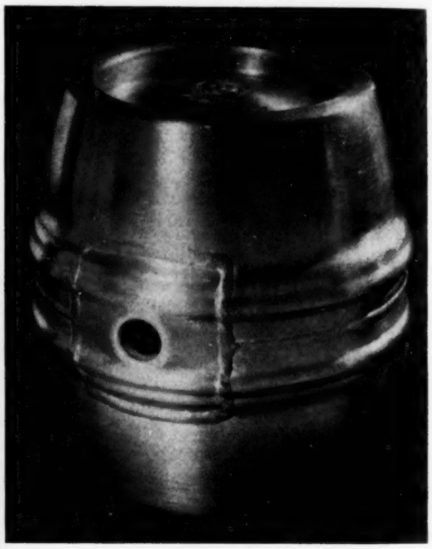
vitamin concentrates, distilled water and many other liquid products of the drug, chemical, cosmetic and food industries.

A bilge aluminum barrel is equipped with rolling beads and fittings and is designed to meet I.C.C. 42-C specifications. This container has recently been approved, in capacities up to 55 gallons, for inclusion in I.C.C. regulations for certain inflammable materials having a flash point below 80° F. Among the materials of this type are lacquers, varnishes and special gasolines.

These aluminum bilge barrels also provide a satisfactory container for solvents used in the manufacture of lacquers, plastics, drugs, cosmetics and leather dressing compounds. They may also be used for dry cleaning solvents, collodion, shellac and petroleum and coal tar derivatives. For products whose quality depends, to a large extent, upon preservation of purity and color, these containers have been found to be of particular value.

The bilge aluminum barrel is also useful in 15- and 30-gallon sizes for non-regulatory products, principally for the shipment of acetic acid, propionic acid, formaldehyde, essential oils and vitamin concentrates. They are also recommended for the same type of non-regulatory products for which carboys are suitable.

Probably the most familiar aluminum member of the metal container family is the aluminum beer barrel, an adaptation of the bilge type aluminum container for non-regulatory products. Introduced into this country's brewing industry about



Aluminum Beer Barrel

seven years ago, the use of this container has been increasing steadily over the ensuing period and has experienced a record adoption during the past year.

Aluminum beer barrels are characterized, primarily, by their light weight, an important feature from the standpoint of shipping and handling. The weight of the aluminum barrel is approximately one-third of the conventional non-aluminum barrel of identical capacity. Furthermore, the aluminum alloy construction provides adequate strength, and this container occupies but two-thirds as much space as the wooden barrels.

Since aluminum does not cause undesirable taste nor color contamination, the use of aluminum beer barrels permits the beer to come in direct contact with the metal.

These aluminum barrels consist of drawn half-shells of heavy gage sheet

aluminum welded together. The side bung and top fittings are of forged aluminum alloy and are welded into the barrel. Standard aluminum beer barrels are produced in eighth- (3.875-gallon), quarter- (7.75-gallon), half- (15.5-gallon), and full-barrel (31-gallon) sizes.

Straight-side aluminum drums meeting I.C.C. 42B and 42C specifications have been used for many years for the trans-

Straight Sided Drum

Light Gage 55 Gal. Drum

portation of certain corrosive and inflammable liquids. They are made in standard sizes up to 110 gallons, constructed from heavy-gage aluminum sheet, and fitted with aluminum or steel rolling hoops. One of the principal uses of the I.C.C. 42B drum is for the shipment of strong nitric acid. The I.C.C. 42D drum is available in the same capacities and is designed especially for the shipment of hydrogen peroxide.

The light gage aluminum drum is a single-trip type container which provides an exceptionally light weight unit for comparatively large volumes. It is available in several capacities up to 55 gallons. The 55-gallon drum is similar in design and construction to the standard 55-gallon 18-gage steel drum and has steel reinforced rolling hoops and double-seamed heads. It weighs about 25 pounds.

Aluminum tank cars are playing an important rôle in carrying non-regulatory products such as formaldehyde, glacial acetic acid, hydrogen peroxide, acetic anhydride and fatty acids when built to specification ARR-201-A-35. Aluminum tank cars built to I.C.C. specification 103-A1 are approved for ethyl acetate, acetone, butyraldehyde, methanol and aviation gasoline.

New Ring Seal Pail Announced by Vulcan Stamping and Manufacturing Co., Inc.

The new Vulco-Seal closure for steel pails (see photograph) is now being produced ranging in size from 2½ to 7 gallons. This container is practical and economical for packaging paints, oils, inks, glues, food products and numerous other materials. No equipment of any type is required for opening or closing.

The manufacturer claims that the design of this ring, incorporating the principal of a dual fulcrum and dual lever arms, operating parallel, causes equal pressure to be exerted at both the top and bottom of the "U" shaped ring. This feature results in an extremely strong closure which is able to resist most transportation abuses and it also retains the desirable stacking features of the lug type pails as there are no inner or outer circumference protrusions. This 5 gallon pail will meet the ICC 6D Specification, which is authorized for transportation of viscous inflammable liquids, inflammable solids and oxidizing materials and Class B poisonous solids.

It is also stated that the ring is of sufficiently rugged construction to allow opening and closing as frequently as desired. eral exterior service are the most satisfactory.

Revised Shipping Rules Become Effective January 7

The revised Regulations for the Transportation of Dangerous Articles which were discussed at a public hearing of the I. C. C. on August 8th (reported on Page 227 of the September Issue) have now been published. Shippers may take advantage of the new Regulations at any convenient date prior to January 7th, 1941, at which time they become mandatory.

The new Regulations have been amplified by a greatly enlarged index with paragraph references for each substance listed. The Regulations follow the present classifications of dangerous commodities but they have been clarified and condensed. The same improvements have been made in the container specifications and in addition a change has been made in the numbering of some specifications. Steel barrels and drums specifications 5 and 6 Series are now changed to 5 Series for returnable drums for liquids, 6 Series for returnable drums for dry materials, 17 Series for single trip drums for liquids, and 37 Series for single trip drums for dry materials.

These new Regulations cover freight, express and baggage car transportation by rail as well as motor truck transportation. They also include regulations for water shipment which will be effective until April 8th, 1941, at which time the Department of Commerce regulations become operative.

The Bureau of Explosives are printing a quantity of the Regulations in loose leaf form for the convenience of shippers. Supplements will be printed so that the original pages will be replaced by the revised sheets. The Regulations will, therefore, be up to date at all times and the present practice of consulting each issued supplement as well as the original Regulations can be discontinued. The

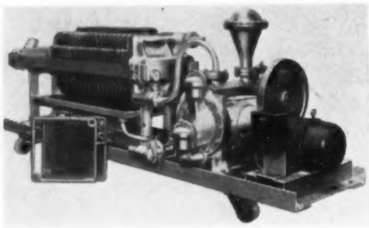
(*Continued on page 82*)

NEW EQUIPMENT

Filter For Corrosive Fluid QC 99

This Filter, while standard as a plate and frame type of filtration and for subsequent washing and even partial drying of filter cake has been specially built to handle acids or corrosive fluids that are injurious to most metals. This avoidance of contact between the material handled and any metal parts assures longer equipment life, and purity of the product.

In this particular unit all plates and frames which are of cast iron have been rubber covered by the anodic process. All piping as well as the drip pan is of rubber lined steel. The pump has the manifolding, valve chambers, heads and expansion chamber likewise rubber lined



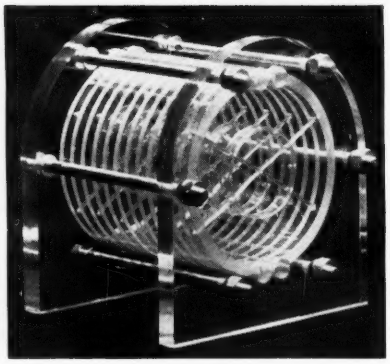
with the rubber diaphragm separating the fluid chambers from the working mechanism of the pump.

This particular unit is an 18 chamber filter with 18" square plates and frames. The plates have an open section criss-cross drainage surface which enhances the flow of clear liquid. This provides for a filtering capacity of from 1000 to 2500 gallons of acid solutions or other corrosive materials depending on the nature of the solids content in the material and the desired rate of flow. The cake holding capacity depends on the thickness of the frames used.

Transparent Dialyser QC 100

The illustrated completely transparent continuous dialyser, used for the recovery of soluble salts or acids from colloidal dispersions received one of the top awards in the Scientific division of the Fifth Annual Modern Plastics Competition.

This laboratory unit made of Lucite consists of two ends between which 11 rings are located. Between each two rings of the unit is placed a membrane of either cellophane, parchment or other suitable material. The solution to be dialysed is led into a manifold at the lower left hand corner of the unit and flows continuously in the even numbered cells. The recovery solution, usually water, is led into a manifold in the upper left hand corner of the unit, and flows continuously through the odd numbered cells. Recovery, or purification, is effected by transfer through the membranes, between the cells.



The unit is an ideal dialyser for experimental use where the plastic is inert to the solution to be dialysed. Because Lucite, a transparent plastic, is used, the operation can be readily observed. This feature is particularly advantageous for close observation of the process.

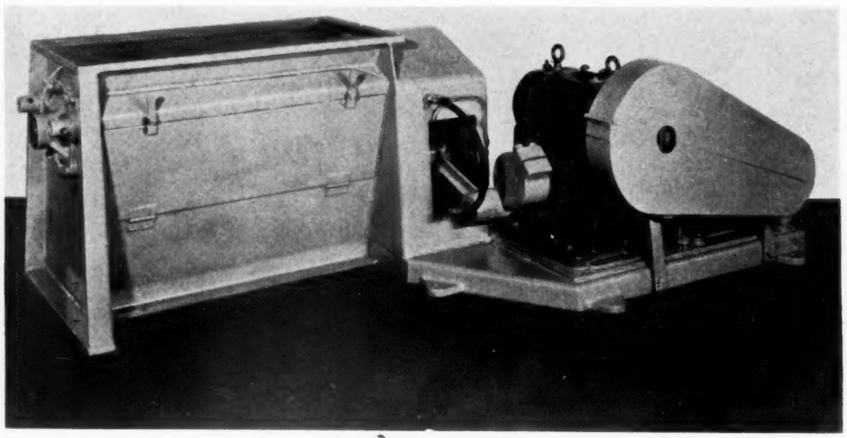
Granulating Machine QC 101

An automatic-screen granulating machine of large capacity, designed especially for use where head-room is limited, has been announced. This type of machine, shown below, is adaptable for breaking down lumps formed while materials are being processed or while standing in containers; for reducing to free-flowing granular powders porous, brittle or bulky materials as they come from dryers; for granulating pharmaceuticals, filter press cake, malted milk, coffee, extracts, etc. When fitted with screens of proper mesh this machine is suitable for preparing materials for tabletting or briquetting. In this process powdered materials are thoroughly blended and mixed with a suitable binding solution. The resulting damp mass can be run through the granulator to produce granules which are readily dried and are then in excellent condition for feeding to the compressing machine.

The machine is of all-steel construction and tightly housed to prevent escape of dust. Outboard rotor bearings assure ample lubrication without contaminating materials being processed. It is claimed that granulations of improved screen analysis can be produced with this type of granulator.

Horizontal Mixer QC 102

A large scale adaptation of the principle of mixing by the method of cut-divide-remix is contained in the engineering and design of this new mixer. The course of the material in the mixing cycle is interrupted and changed 26 times per minute. The mixing and lifting baffles are offset, so that they alternately collect their loads from opposite ends of the drum and feed them evenly back to the dual spirals. These spirals revolving in opposite directions again divide the load, and each spiral carries its portion to the opposite end of the drum. With six baffles and two spirals operating in a drum revolving 4½ times per minute, the mathematical calculations of the degree of mix rapidly reach completeness. In field work, in development of the mixer, and in experimental installations, it is reported that the completeness of the mix, and the shortening of mixing time, have proven highly satisfactory.



Chemical Industries
522 Fifth Ave., N. Y. City.

I would like to receive more detailed information on the following equipment: (Kindly check those desired.)

QC 99 **QC 101**
QC 100 **QC 102**

Name ....

Title .... **Company** ....

Address ....

"New Chemicals for Industry," the display of 501 new chemicals developed in the past three years by the advertisers in *Chemical Industries*, was one of the distinct "hits" of the recent highly successful National Chemical Exposition, sponsored by the Chicago Section of the American Chemical Society. "New Chemicals for Industry," in response to many requests, will be displayed in several sections of the country during 1941.

NEW CHEMICALS FOR INDUSTRY

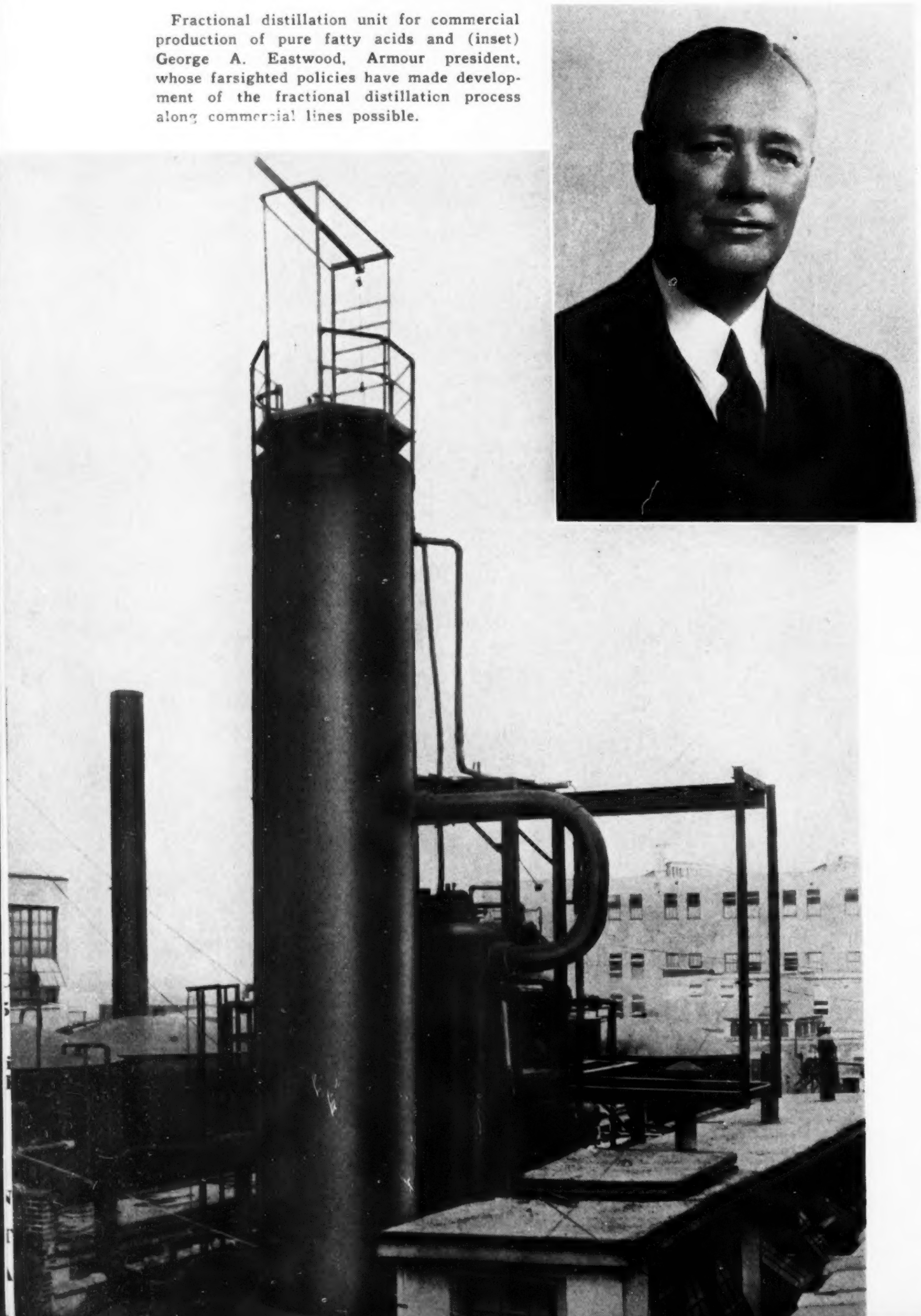
Digest of Chemical Developments in Converting and Processing Fields

FRACTIONAL DISTILLATION

Of Fatty Acids

By Dale V. Stingley, Armour and Company

A New Chemical Process Industry Is Growing Up Around the New Methods of Distilling Fatty Acids. Not the Least of These is a Substantial Contribution to National Self-Sufficiency in Synthetic Drying Oils.



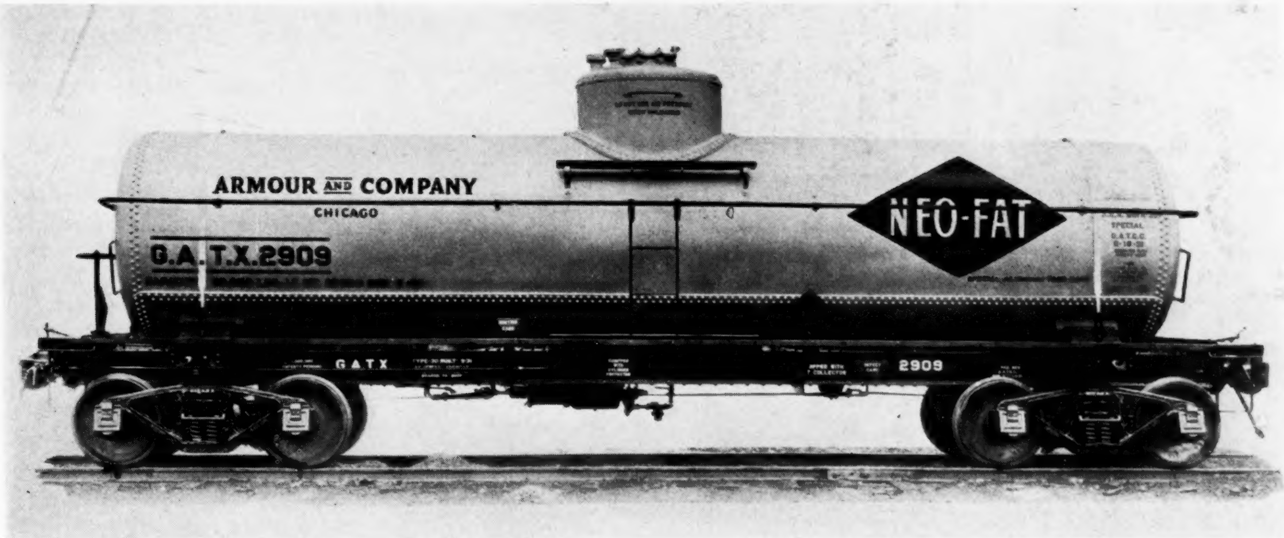
Fractional distillation unit for commercial production of pure fatty acids and (inset) George A. Eastwood, Armour president, whose farsighted policies have made development of the fractional distillation process along commercial lines possible.

FATTY acids of various types of vegetable and animal fats have been available for years. Most commonly known are the mixed fatty acids of cottonseed oil, corn oil, coconut oil and tallow. Each of these grades contain varying percentages of from four to eight different fatty acids, and the selection of a fatty acid for a particular use has been necessarily limited as the mixed type containing the highest percentage of the specific fatty acid desired was usually chosen. For example, coconut oil fatty acids containing about 48 per cent. lauric acid was used when lauric acid was desired although the balance of the fatty acids present was a varying mixture of eight other acids, ranging from caproic to linoleic acids. No derivatives of pure acids could be prepared directly and the problem of producing uniform finished chemical products from natural raw materials greatly retarded the utilization of fatty acids.

Until recent years pure fatty acids were little more than chemical curiosities and while some research on the physical and chemical characteristics of individual fatty acids had been conducted, in the main this data was inadequate and little if any consideration had been given to possible commercial applications. Despite this fact, no one denied the desirability of pure fatty acids as chemical raw materials; in fact certain men in Armour and Company were so impressed with the potential possibilities of this field that some years ago a definite program of research was instigated to solve the problems that had so long prevented the commercial exploitation of pure fatty acids, and as a result the fractional distillation process was developed.

Established Many Years

Possibly the designation of a "new chemical process industry" in connection with the distillation of fatty acids may sound presumptuous. The production of fatty acids has been an established industry for many years, and historically the purification of mixed fatty acids is one of the oldest chemical industries. Hydraulic pressing and simple distillation in cast iron pot stills have been the only methods of any consequence heretofore employed in the fatty acid industry. Of these methods, the simplest and probably the oldest is the pressing method. Producing fatty acids by pressing is largely a mechanical process and while relatively simple in operation, this method is handicapped by the fact that it is limited in its scope, both as to the raw materials that may be employed and as to the products that may be produced. Essentially a fatty acid pressing plant operates as follows. Crude fatty acids obtained from low grade tallow or other greases containing considerable amounts of palmitic and stearic acids are cooled until a solid cake is formed. This cake is then placed in filter bags and subjected to pressure in a special hydraulic press and the pressure thus employed expels the liquid acids from the solid acids in the cake, producing red oil or oleic acid as the liquid portion and simple pressed stearic acid as the solid acids remaining in the press. One to three



Typical tank car for shipment of Armour Fatty Acids, known as "Neo Fat."

pressing operations are employed and the grade of acid is designated by the number of these pressings Commercial pressed stearic acid produced by the above method contains approximately 60 per cent. palmitic acid and 40 per cent. stearic acid, with small amounts of unsaturated acids. For many years this acid was the only saturated acid available and a great many standard formulations have been built around this product.

The second method of producing fatty acids is by distillation. This process has had its development within quite recent years and it is the fatty acid distiller who is producing the new fatty acids now appearing on the market. Briefly in the distillation process, crude fatty acids are injected into a vacuum distillation unit, where the fatty acids are vaporized and separated from the non-volatile impurities, which remain in the still to be drawn off later as stearine pitch. Simple distillation produces purified acids which are light in color but which still have the same fatty acid composition as original crude acids.

A major improvement over this type of simple distillation has been the development of the fractional distillation process. In this process the distillation is carried out in such a manner that not only are the non-volatile impurities removed but the component fatty-acids themselves are separated into purified fractions according to their boiling points. This process is the most effective method now known for the purification of fatty acids, and is covered by patents in the United States and also foreign countries. The fractional distillation process is not limited in its choice of raw materials and almost all the naturally occurring fatty acid can be purified by this process. If in addition, hydrogenation procedure is utilized, acids such as arachidic and behenic acids which occur only rarely in nature can be produced. When we consider the versatility of this method, it is easy to see why a great number of new fatty acid products have now appeared on the market. This new technique of fractional distillation of fatty acids has opened up an entirely new field of aliphatic chemistry. Fatty acids of a purity high enough to serve as chemical raw materials made their advent in commercial circles about five years ago. The derivatives of these pure fatty acids, both actual and potential, are myriad and offer almost unlimited possibilities for application in every field of chemistry.

The economics involved in the production of fatty acids by the fractional distillation process are also worthy of consideration. The process could not succeed on a volume basis unless raw material and production costs were favorable.

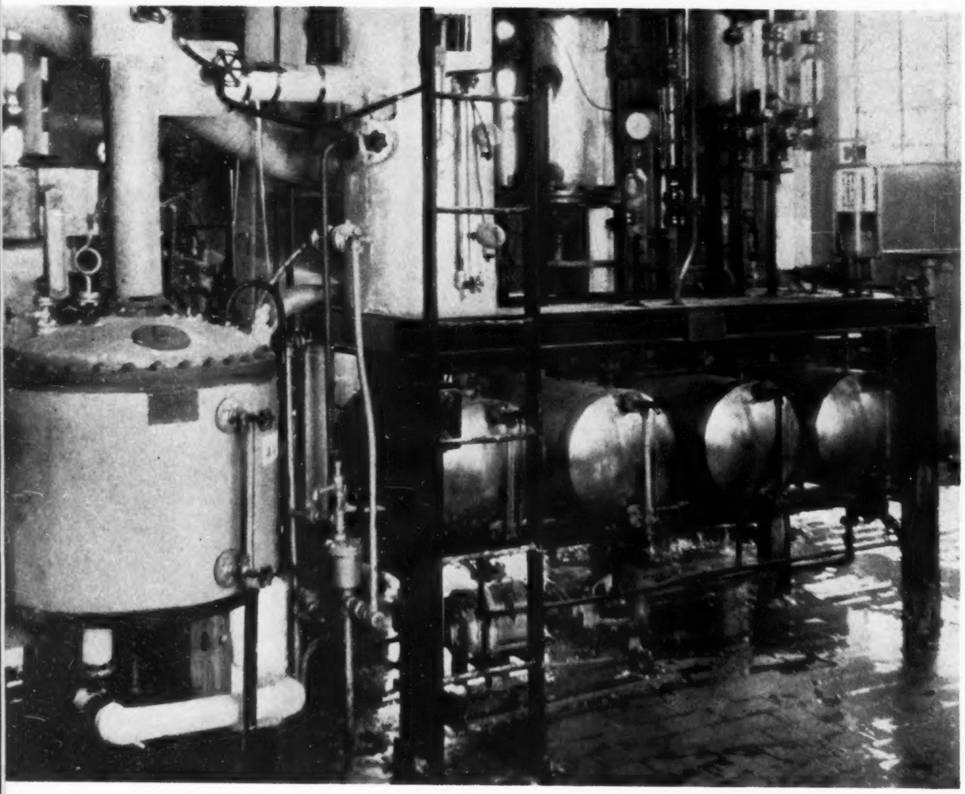
In the beginning costs were high, as despite the fact that abundant supplies of relatively cheap raw materials were available, this advantage was largely offset by excessive production costs. Now constant improvement in both methods and processing equipment have materially decreased these costs, so that today in many cases, fractionally distilled fatty acids are available at no greater cost than ordinary straight distilled mixed fatty acids. Fatty acids that previously had been available in limited quantities at prices of from 75 cents to $3.00 per lb. are now shipped in tank cars in ever increasing volume in a range of eight and one-half cents to seventeen cents per lb.

Commercially pure saturated fatty acids available in tank car quantities or less include the acids from caprylic to stearic, with the probability that in the near future this will be extended to cover the commercial production of arachidic and behenic acids. As a matter of interest a tabulation of the physical and chemical properties of these commercial acids as compared with the chemically pure acids follows:

TABLE I

Comparison of Chemically Pure and Commercial Fatty Acids

	Caprylic Acid $C_7H_{15}COOH$	Acid Capric $C_9H_{19}COOH$	Lauric Acid $C_{11}H_{23}COOH$	Myristic Acid $C_{13}H_{27}COOH$	Palmitic Acid $C_{15}H_{31}COOH$	Stearic Acid $C_{17}H_{35}COOH$
Chemically Pure Fatty Acids						
Mean Molecular Weight	144.12	172.15	200.19	228.22	256.25	284.28
Melting Point	16.5°C.	31.3°C.	43.6°C.	53.8°C.	62.85°C.	69.9°C.
Iodine value (Wijs)	none	none	none	none	none	none
Neutralization Value	389.	326.0	280.0	246.1	219.0	197.0
Unsaponifiable Matter	none	none	none	none	none	none
Color	water white	white	white	white	white	white
New Commercial Fatty Acids						
Mean Molecular Weight	145.7	173.3	203.0	226.0	258.0	282.5
Melting Point	13.0°C.	30.0°C.	37.8°C.	51.0°C.	58.0°C.	67.0°C.
Iodine value (Wijs)	0.8	1.0	1.0	2.0	3.0	3.0
Neutralization Value	385.	323.7	276.0	248.0	216.0	198.0
Unsaponifiable Matter	trace	0.5%	0.4%	0.2%	0.5%	0.5%
Color	water white	white	white	white	white	white



Experimental fatty acid distillation unit.

These pure commercial acids and their derivatives such as alcohols, aldehydes, ketones, esters, metallic salts, nitriles, amides, amines, etc., are daily growing in importance. Synthetic perfume oils, essences, flavors, disinfectants, non-toxic insecticides and agicides, flotation chemicals, synthetic resins, dyestuffs, pharmaceuticals, cosmetics, solvents, plasticizers, emulsifying agents, lubricants, rubber compounding, paints, varnish, enamels, waxes, cutting oils, etc., are all fields where their worth is now established.

Another outgrowth of the fractional distillation process has resulted in the production of purified unsaturated acids, and while these products are more highly specialized as to their applications, their importance is inestimable, particularly when national economy demands the wider utilization of domestic raw materials.

To be more specific we can mention the recent widespread development and application of alkyd resins in the protective coating industry, which has created a demand for improved unsaturated acids to meet the various requirements for special coating materials. Unsaturated acids consisting of predominately linoleic acid have been developed for non-yellowing baking white finishes for refrigerators, hospital-equipment, etc., other fatty acids are especially adapted for use with urea-formaldehyde and the new melamine resins. Improved fractionated soybean fatty acids with iodine values of around 150 have greatly increased the applications of soybean oil in varnishes and enamels. Products from the fractional distillation of marine oil fatty acids with iodine values as high as 250 are also available.

Another development of the utmost economic importance has been the reconstruction of these new unsaturated acids to their corresponding triglycerides, thus making available new synthetic drying oils from hitherto unimportant domestic sources.

In the past this country has been dependent on foreign sources for almost two-thirds of its total requirement of drying oils, and uncertain world condition in recent years have shown the imperative need of providing domestic sources of these oils. Commercial products in the drying oil field now comprise synthesized rapid drying oils from marine oils which have greatly alleviated the present tung oil shortage and in the near future synthetic oils from fractionally distilled soybean fatty acids to augment the inadequate domestic production of linseed oil.

When we consider that the fractional distillation process has opened up an entirely new chemical field, that it has made possible the utilization of domestic fats and oils to relieve American industry from its dependence on foreign imports and that everyone from the farmer who produces the raw materials to the factory worker whose job depends on the products of this process can be materially benefited, it does not seem presumptuous to say that the fractional distillation of fatty acids is truly "a new chemical process industry."

Industry's Bookshelf

The Condensed Chemical Dictionary, Second Edition, compiled and edited by the Editorial Staff of the Chemical Engineering Catalog; Reinhold Publishing Corp., New York, N. Y., 551 pages, $10.00. The increased part that the chemical industry is taking on the national industrial front is reflected by the large number of inquiries for sources of information relating to the industry. The need is quite well met by many publications that are known by the initiated, but there are many who are not readily familiar with these sources of information. This dictionary has been compiled primarily for the benefit of these people not educated along chemical lines but whose connection with the chemical business necessitates their acquiring information about chemical products. In addition to the dictionary section, the book also contains some commercial and shipping information as well as a number of tables of physical and chemical data.

Handbook of Chemistry and Physics, 24th Edition, Charles D. Hodgman, Editor-in-Chief, Harry N. Holmes, Associate Editor, Chemical Rubber Publishing Co., 2581 pages, $3.50. This newest edition of an always popular and much used reference work contains extensive revisions and additions. In all 342 pages have been added to the Handbook and it contains 688 pages of new composition. A new feature is a sixty-five page table of the physical constants of industrial organic compounds. This section has been prepared with the assistance of manufacturers of these chemicals and provides in tabular form the trade name, formula, specific gravity, melting and boiling points, uses, solubility, source of supply, etc. Another new table of interest to those interested in the latest achievements of modern science is that regarding induced radioactivities. Probably the most important revision is that the table of physical constants of organic compounds has been changed from the paragraph form to tabular arrangement. This change should be welcomed as the majority of users find the tabular presentation of data much more convenient. Outside of other miscellaneous revisions and additions the Handbook takes the same form and remains one of the most complete and reliable sources of information for chemists and others interested in science.

New Products and Processes

By James M. Crowe, *Assistant Editor*

AT this time when so many trade channels of the world have been disrupted, it is interesting to read in some of the foreign publications of the attempts being made to acquire self-sufficiency by developing new products, adapting old products to new uses, or finding new sources of supply for raw materials.

Among these projects, we read of an ambitious plan by which Japan expects to bolster her chemical independence. In this project, the Meiji Mining Co. proposes to erect a plant for the production of caustic soda, magnesium, hydrogen, chlorine and hydrochloric acid from sea water. The method to be used has been developed by Dr. Hiroshi Suzuki, former president of the Research Institute of the Monopoly Bureau of the Ministry of Finance.

Last September, the company completed a one and one-half million yen pilot plant. The trial operation is claimed to have proved the possibility of using the process for large scale industrial applications. The company is now seeking authorization of a plan to invest fifteen million yen in a full scale plant.

A brief outline of the process in *Toyo Keizai Shimpo* tells little of the details of the process, merely saying that sea water, after being freed from scale-forming substances, is concentrated in a boiler, the steam raised being used to generate power for the electrolysis stage, which follows the separation of the magnesium hydroxide from the water. No indication is given of how the boiler system is made to withstand the corrosive effects of brine and the method for preventing the steam from carrying salt particles into the turbine-generator system.

British research is also active. Among the many items, we note the announcement and discussion of a new fire-resistant rayon produced from seaweed. The abundancy and cheapness of this raw material close at hand was emphasized as a factor that might become important in war. It was pointed out that 400,000 tons per year were formerly gathered in the Hebrides, and taking the west coasts of Scotland and Ireland as a whole, far greater supplies are available. The dried seaweed contains twenty to thirty per cent. of alginic acid which is readily extracted by means of sodium carbonate solution. An alginate solution is extruded through spinnerettes into an acid coagulating medium containing an emulsified oil. The filaments are formed in this bath and drawn off in the form of thread.

The major handicap that had to be overcome in the successful development of this product was its solubility in alkaline or soap solutions. The method that was found to overcome this handicap and make the product washable is said to constitute the real secret of the new fabric and has not been disclosed.

Another product of British research discussed in the *Chemical Trade Journal and Chemical Engineer* is a woolcombing oil. Until comparatively recently, olive oil was the principal oil used in the great British woolcombing industry. During the past several years, owing to the economic and other uncertainties attending the supply of this oil to the British Isles, considerable attention has been given to the possibility of developing alternative materials; and as a result of research, it is said that products superior to olive oil are now at the disposal of the industry.

An account of this work was given by W. Garner in a paper delivered to the Scottish Section of the Society of Dyers and Colourists. According to the report the requirements of a suitable woolcombing oil are onerous, the standard of quality being attained by only a few of the naturally occurring non-drying oils, for example olive and neatsfoot. Certain other oils, for example arachis, approach the standard but are ruled out because their yield of petroleum insoluble bromides is too high. It is pointed out that the end products of the oxidation of woolcombing oils in application depend entirely upon the chemical constitution. Olive oil yields 6-7 per cent. of petroleum-insoluble bromides and as even olive oil has been known to give trouble, this value of the P.I.B. is taken as an upper limit.

Normally arachis oil gives a P.I.B. figure of 12-15 per cent. but as a result of research a liquid—processed arachis oil was developed with a P.I.B. figure of only 0.5 per cent. When a difficulty arose in the production of this modified natural oil, entirely synthetic oils were resorted to. The number of fatty acid esters providing a suitable starting point was small but one such product namely cyclohexanol oleate was found and a woolcombing oil giving a zero petroleum-insoluble bromide yield was obtained.

Progress achieved in Germany before the war in the economical use of metals and the development of substitutes has been accelerated by war-time scarcity. The method of compound casting in which bronze and other bearing metals were conserved by using backings of first steel and later cast iron is being supplemented now by the use of plastics. As a result of much study and experimentation, plastics are being used for bearing surfaces. Overheating has been reduced by use of more suitable lubricants, by redesigning lubricating channels and by water cooling. In the latter case, the water comes in contact with the shaft itself at the center of the plastic bearing instead of passing through channels in the shell. The water is prevented from entering the bearing surfaces by a non-emulsifying grease. Experiments are being carried out wherein the shaft as well as the bearing surface is covered with plastic material. These plastic bearings have been applied in installations of ore crushing equipment, rolling mills, revolving cement furnaces, calendars for artificial rubber, and other applications. It is claimed that in some instances plastics are no longer considered substitutes but have been found superior.

Cutting Oil

The defense program has put emphasis on the production of machine tools. In this direction there has been announced a newly developed cutting oil to be used on difficult, high-speed operations, particularly on stainless steels and alloys developed for aircraft use. This is a non-gumming, polymerized combination of fatty waxes, sulfur, fat and mineral oil, treated to form saturated compounds of high lubricity and extreme pressure qualities. "Quaker Kut No. 141", as the new oil is called, is furnished ready for use but in some cases can be diluted paraffine oil. It is said that this product gives an excellent finish and in some cases permits the feeds and speeds of the machines to be increased.

Powerful Disinfectant

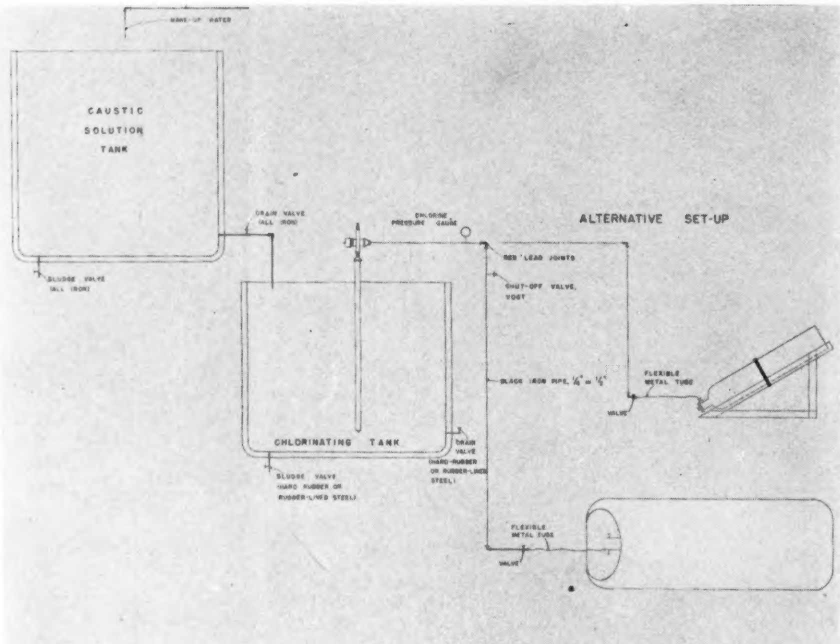
A new product claimed to be the strongest phenol disinfectant known is now being offered under the name "Moldol". In a 0.1% solution the new product proved to be three times as effective as corrosive sublimate and sufficient to preserve products subject to mould or mildew. The Rideal-Walker test shows a coefficient of 40 in a soap solution and a coefficient of 140 in a water solution. It is said to be practically non-poisonous and only slightly irritating. It has been used satisfactorily in glue, ink, gum, paste, sizes and finishes.

New Finishes for Textiles

A series of synthetic resin finishes for crease-proofing, shrinkage-setting, pigment printing, and other textile applications are now under development. The first of these new finishes to reach the market is a pre-condensed urea-formaldehyde resin called "Formaset No. 8". This is a water clear product which posseses remarkable stability in solution and is therefore an effective agent for permanent textile finishing.

CHEMICAL SPECIALTIES

B. F. Goodrich Co., Akron, recently introduced Texglue, with a latex rubber base, compounded to afford exceptional adhesive properties and resistance to aging. Product, it is claimed, will attach fabrics, paper, and other materials to non-porous surfaces, and can be easily cleaned from these surfaces when its mission is accomplished. Note the wealth of information supplied the user.



TYPICAL INSTALLATION FOR MAKING SODIUM HYPOCHLORITE IN LIQUID PHASE

One of the Leading Specialties in Point of Sales Volume is Liquid Laundry Bleach. The History of this Product, Its Formulation, and Method of Manufacture are Discussed in Detail.

LIQUID LAUNDRY BLEACH

Its Formulation and Manufacture

By Benjamin Levitt, ***Consulting Chemist***

The Author

ENERGETIC advertising appeal to housewives, and constant research on the part of laundry owners and chemical manufacturers, has increased the sale of liquid laundry bleach over 300 per cent., in the past few years as shown by the following census of manufacturers:

Sodium Hypochlorite Basis 15 per cent. Available Chlorine.

Year	No. of Est.	Tons	Value
1933	18	32,468	$2,073,133
1935	53	50,807	4,304,921
1937	63	75,073	6,274,888

Historical

Shortly after Karl Wilhelm Scheele, a Swedish chemist discovered chlorine, in 1774, it was found that this new gas had powerful bleaching properties. But until Berthollet discovered that a strong bleaching solution could be prepared by dissolving chlorine in potassium carbonate, the process of bleaching with chlorine was very crude, obnoxious and fraught with danger to the operators and often to the fabric itself.

Berthollet's new bleaching agent was later manufactured on a commercial scale at Javelle, near Paris, and it was there that the product received its name, Eau de Javelle, which it still retains. A similar product made by substituting soda ash for potassium carbonate, was formerly called Eau de Labarraque, but at present, the former name (Javelle Water) is generally applied to both solutions. They contain about 1 per cent. available chlorine.

Preparation of Sodium Hypochlorite Solution

Although sodium hypochlorite is still produced on a small scale by reacting high test calcium hypochlorite (containing 70 per cent. available chlorine) with soda ash, by far the most important method for producing soda bleach liquor, is by the use of liquid chlorine and a solution of caustic soda, the reaction being:

$$2\ NaOH + Cl_2 \longrightarrow NaOCl + Na\ Cl + H_2O$$

Equipment

Standard equipment consists of a steel caustic soda dissolving tank, with a grating several inches from the bottom, whereupon, the solid caustic soda may be set, by means of a pair of grab hooks attached to a chain hoist and tram rail. Here, the caustic soda covered with water, dissolves without agitation. The lye may then be pumped to a suitable storage tank by means of a rotary pump Sufficient time must be allowed for the lye to cool to room temperature, and to settle the sludge caused by the combination of the caustic soda with the lime and magnesia salts in the water. On the other hand, the nuisance of handling solid caustic soda may be avoided by using 50% liquid caustic soda, which may be diluted as required.

The chlorinating tank for small scale

operation, may be a stone crock, which can be obtained to 450-gallon capacity. Chlorine in the gaseous phase may be introduced by means of a porous alundum diffuser, which can be had in either of two sizes, namely six to twelve inches in length. The alundum diffuser is fitted with hard rubber, and connection between the diffuser and the chlorine cylinder, is made of pure gum rubber tubing. It has been found that this diffuser allows more rapid chlorination because the chlorine is introduced in the form of a multitude of minute bubbles.

In large scale installations, the chlorinating tank may be constructed of vitrified tile set on a concrete foundation, but reinforced concrete is most generally used. As a measure of protection from corrosion, and to insure against leakage, the tank should be painted with a special paint comprising a chlorinated rubber base.

The chlorinating tank should be equipped with a diffuser tube ½ inch to ¾ inch diameter, which extends from the control valve, down through the solution to the bottom of the tank, where it forms a spiral, closed at one end, and perforated with 1/16 inch holes, spaced 12 inches apart. This coil may be of lead for bleach not exceeding 70 grains available chlorine per liter, but for stronger solutions, up to 150 grams per liter, the coil should be constructed of rubber covered Pyrex glass, or Hastelloy C. These tubes can be had in various lengths up to 9 feet. The minimum depth for introduction of chlorine in the liquid phase, is 4 feet of depth of solution.

A recent development, is that of the Mathieson Sparger tube, which is constructed of 22 gauge fine silver, ¼ inch internal diameter, reaching to the bottom of the tank, where it is bent so as to point horizontally, with the end flattened into a fish tail, to insure better distribution of the chlorine. Furthermore, the special advantages of this innovation are that no manual agitation of the solution is necessary, because the liquid and gaseous chlorine is ejected from the tip of the Sparger tube at a velocity of one-half to eight pounds of chlorine per minute, which produces the circulation required. It is said that by this method, a quantity of hypochlorite can be produced in one-eighth to one-tenth the time required by previous methods of diffusion. Also, due to the heat required for the vaporization of the liquid chlorine, which is taken up from the caustic soda solution, there is economy in refrigeration costs, over other methods. The Sparger tube costs $15 to $20, is corrosion proof and lasts indefinitely.

A flexible copper tube is recommended for joining the permanent pipe line with the valve of the chlorine container. A chlorine pressure gauge is to be located in the line between the control valve and the chlorine container.

All the leading producers of chlorine and caustic soda issue valuable booklets on the subject of production of bleach. Readers of this informative article are urged to ask for this literature. Names of chlorine and caustic soda sources are listed in the *Buyer's Guidebook Number*, or if readers so desire, *Chemical Industries* will be pleased to furnish a complete list of producers.

A platform scale and a hoist for the large chlorine containers are necessary adjuncts to the installation. The scale is used to indicate the amount of chlorine used during the progress of the chlorination.

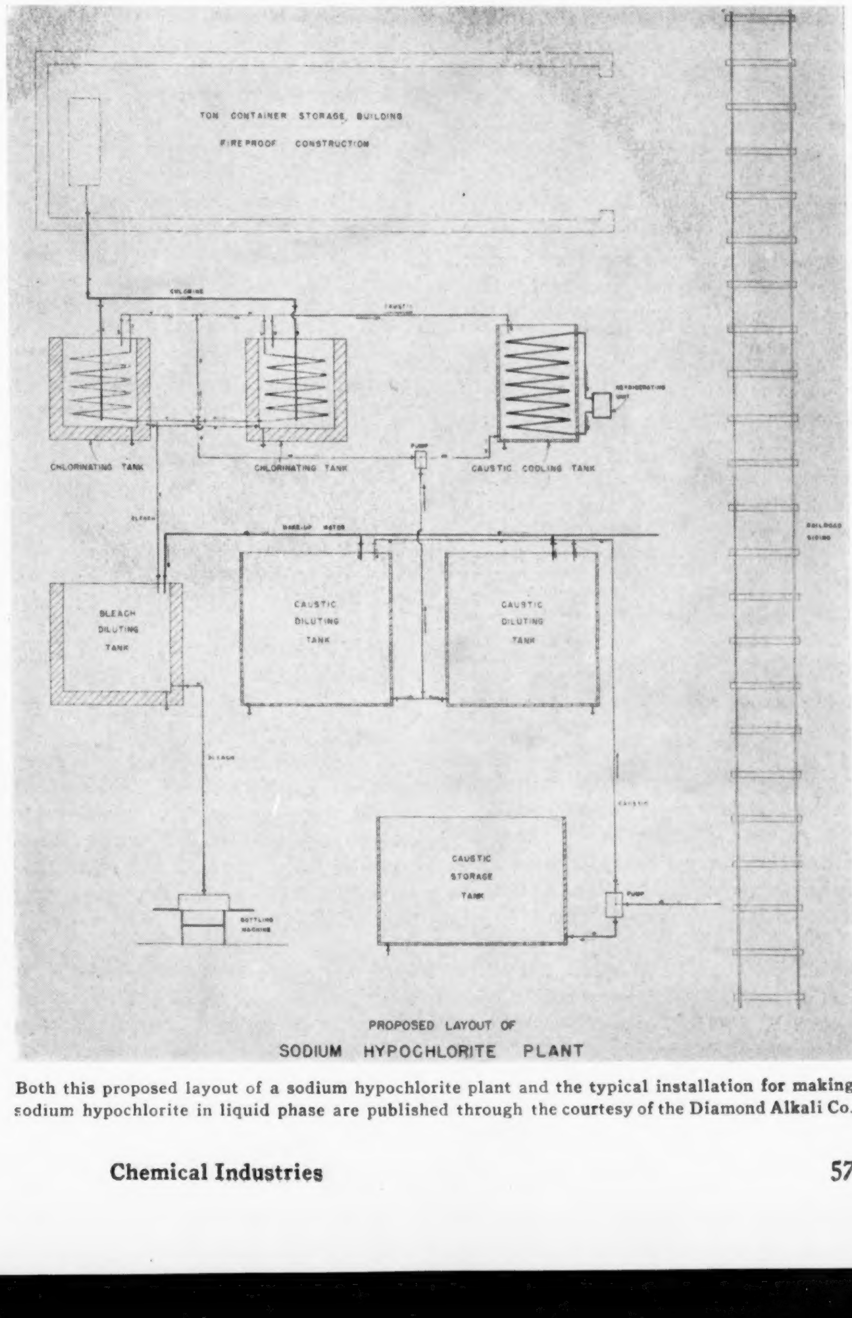
For filling bottles, etc., outlets consisting of hard rubber tubing with plug cocks may be fitted directly to the chlorinating tank. For large scale, automatic filling machines are more practical.

When a solution of caustic soda is chlorinated, the volume is increased about 4 per cent. for 50 G./L., 8½ per cent. for 100 G./L., and 13 per cent. for 150 G./L. available chlorine, even when the solution is kept at a constant temperature of 20°C. during the chlorination. Furthermore, considerable heat is evolved.

To obtain satisfactory chlorination, the solution must be cooled. Ice may be added to the solution while chlorinating. For example, suppose we dissolve two (700-pound drums) of caustic soda in 656 gallons of water, and chlorinate with 1166 pounds of liquid chlorine. During the addition of the chlorine, 1200 pounds of ice will be necessary to cool the solution. This will yield 822 gallons of 15 per cent. sodium hypochlorite.

Refrigeration may be furnished by an ice machine, through stoneware cooling coils in the chlorinating tank. This is the more satisfactory method, for large installations. Where refrigeration is also supplied to the lye tank, iron coils should be employed.

In the formulation of sodium hypochlorite bleach, it is always advisable to have a slight excess of caustic soda in the finished product. This amounts to ¼ per cent. in a 1 per cent. bleach, to about 1 per cent. in the 15 per cent. product. This excess acts as a stabilizer for the chlorine, otherwise the CO_2 from the atmosphere would immediately begin to decompose the solution.



PROPOSED LAYOUT OF
SODIUM HYPOCHLORITE PLANT

Both this proposed layout of a sodium hypochlorite plant and the typical installation for making sodium hypochlorite in liquid phase are published through the courtesy of the Diamond Alkali Co.

For the various strengths, the following quantities of materials are required:

Per Cent. Available Chlorine	Lbs. Cl_2 per 100 Gals.	Lbs. NaOH per 100 Gals.	Weight Per Gal. Bleach	Temp. Rise in Dgrs. Fahrnt.
1	8.5	11.1	8.51	6°
2	17.3	22.5	8.67	13°
3	26.5	34.5	8.84	19°
4	36.0	47.0	9.01	25°
5	45.5	59.2	9.09	32°
6	55.0	71.5	9.17	38°
7	64.8	84.3	9.26	44°
8	75.4	98.0	9.42	50°
9	87.7	114.0	9.67	57°
10	98.4	127.9	9.84	63°
11	110.0	143.0	10.00	69°
12	121.1	157.4	10.09	76°
13	132.3	172.0	10.18	82°
14	145.0	188.5	10.34	88°
15	158.0	206.4	10.51	95°

Approximately 1.3 pounds of caustic soda are required for each pound of chlorine. This will vary with local conditions.

Strong solutions of sodium hypochlorite are sold to laundries, and are manufactured in textile plants for bleaching cottons and linens. For use, they are diluted to 1 per cent. available chlorine. The product is distributed in 54-pound glass or earthenware carboys and 128-pound rubber lined drums. For domestic use, the 5 per cent. product is sold in pints, quarts and gallons, packed in colored glass to prevent decomposition by the actinic rays of light.

Leakage may be readily discovered because of the pungency of chlorine gas. The exact point of leakage can be detected by holding a bottle of ammonia at the various points suspected. Dense white fumes of ammonia chloride indicate the leak.

A chlorine mask such as recommended by the U. S. Bureau of Mines should always be at hand. Although mild exposure to chlorine has no cumulative effects, the victim of chlorine should immediately be removed into the fresh air and a physician should be called.

Its relative toxicity in air is as follows:

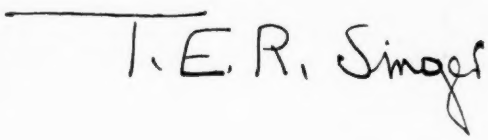
1 part per million is safe indefinitely.
4 parts per million is safe for half to one hour.
40 to 60 parts per million will cause illness in half to one hour.
1000 parts per million is fatal in half hour or less.

Although there are several methods for electrolytic preparation of sodium hypochlorite from salt, these have not been discussed here because the solutions so produced are unstable, and are not within the scope of specialty manufacturers.

Thankful acknowledgment is here given to Messrs. Wm. D. Marshall and Ralph L. Carr of the Mathieson Alkali Works, to Mr. M. C. Holt, Diamond Alkali Co.
References: Solvay Booklet on Liquid Chlorine, and Bleaching and Related Processes by J. M. Matthews.

Foreign Literature DIGEST

By



T. E. R. Singer

LA CHIMICA E L'INDUSTRIA, XXII, No. 2, Feb. 1940, p. 97-101.

Statistics are given on Italian importation and exportation of chemical and related products from January 1st to June 30, 1939.

La Chimica e L'Industria, XXII, No. 2, p. 63-66.

W. Ciusa discusses antioxidants for fats and oils. After giving the conditions, etc., connected with the process of the oxidation of fats and oils, he discusses methods for studying the effectiveness of antioxidants. He comments on such antioxidants as hydroquinone, phenol, pyrocatechin, resorcin, oxyhydroquinone, pyrogallol, maleic acid, tartaric, citric, fumaric, phthalic, cinnamic, anthranilic, oxalic, malonic, malic sulfuric, phosphoric and perchloric acids. He also reports on natural antioxidants such as lecithin, unrefined carotene and licopene, inhibitor extracts from lactuca sativa, tomato, carrot, spinach, oil from grain embryo, cottonseed, etc. The three different types of antioxidants: acid type, inhibitors and hydroquinone, and phenol type, are varied in their activity when used with different kinds of fats and oils. The practical application of these antioxidants is described. The author also lists a good number of excellent references on the subject.

Industrial Organic Chemistry (U.S.S.R.), Oct. 1940, VII, No. 10, p. 581-84.

A. D. Sokolov reports on work accomplished by the Institute of Plastic Masses. The following plastics are to be produced on a commercial scale in the very near future: vinyl acetate, vinyl resins for such purposes as cables, records, anticorrosion agents, styrol and polystyrol, asbovinyl, ethyl cellulose, thermo-insulation materials and others. The following new plastics were produced and tested on a laboratory scale at the Institute: Vialite, new types of Faolite, Flibit, Flivin, vinyl lacquer (note: three of these names are just phonetic translations and could not be found in Hack's dictionary—should be checked).

A method was tested for the polymerization of vinyl chloride mixed with a solvent-precipitator which produces a finely powdered polymer of good quality and with a satisfactory yield. Considerable work was done on the polymerization of vinyl chloride in aqueous emulsions, including the study of the stability of the monomer emulsion with different emulsifying agents and the progress of the polymerization at different pH's. The yield of the polymer is 97% when the best emulsifying agent is used, with a pH range of 2.8-9.3 and 70-90 hrs. of polymerization. The emulsified polymer can be produced having a high temperature of decomposition, 160-190°, and a viscosity of 1.7-2.0.

Success was attained with work on the photopolymerization of vinyl chloride. This method produced a fine quality polymer without the need of supplementary treatment or purification. It is also very fast—20-48% conversion can be accomplished in one hour.

Although the vinyl resins produced commercially are of very poor quality, the Institute succeeded in using them, with some additional treatment, for the production of records. An alcoholic resin was worked up into a plastic with satisfactory dielectric properties and mechanical durability for use in cable. Research on polychlorovinyl cables is being conducted in cooperation with the plant "Sevkabel" and the results are expected to permit the economy of a great deal of lead.

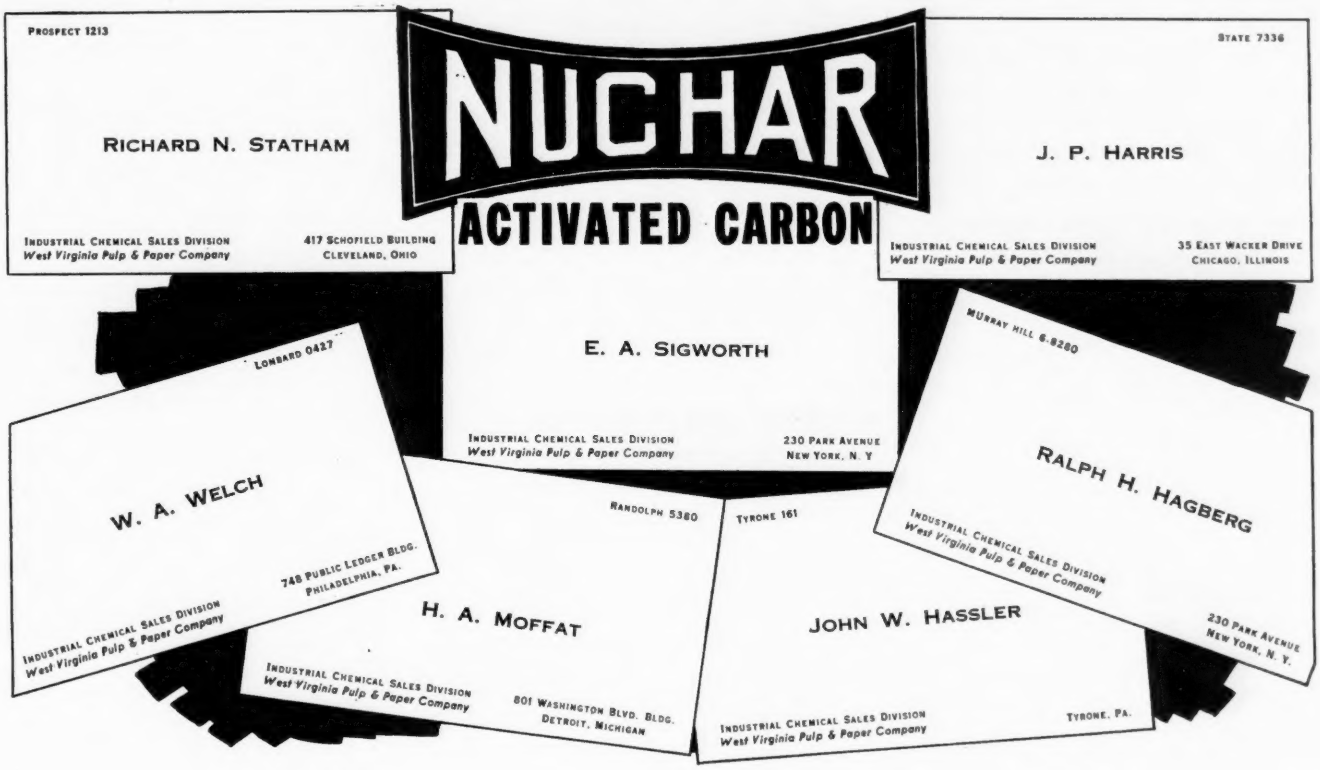
In the production of polymers and copolymers of styrol by dehydration of ethyl benzol, the carbon deposit on the catalyst was reduced from 50-60% to 3-4%. This simplified the regeneration of the catalyst.

A test was conducted on the method for producing pressed powders on the basis of the condensation products of methylene urea and urea with formaldehyde. The production of these powders could be increased if the production of methylene urea were better established.

(*Continued on page 64*)

On Your Staff . . .

BUT NOT ON YOUR PAYROLL



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CHEMICAL SPECIALTY News!

N. A. I. D. M. Opens Membership to Equipment Manufacturers— P. C. O. Conference Program — Nopco Bonus — Company News

MEMBERSHIP rules of the National Association of Insecticide & Disinfectant Manufacturers have been constitutionally revised to admit to associate membership "all reputable firms, corporations, or persons engaged in the manufacture of equipment, devices, containers, or other materials or services" used by the industry, except those now entitled to active membership status under the revised Section 2, Article X of the constitution. Associate members will enjoy all privileges of active membership but may not vote or hold office.

Resolutions adopted at the December meeting of the group in New York City included:

A recommendation that household insecticides, disinfectants, and other household sanitation products be divorced from products of an agricultural nature in the formulation of provisions of various state and other local legislation affecting insecticides and disinfectants.

A resolution opposing all state, local and other fees required for the registration and licensing of products for sale within state or municipality and recommending that members oppose introduction or adoption of registration fees which it considers excessive.

P. C. O. Conference

Fifth annual Pest Control Operators' Conference with the most elaborate agenda thus far achieved by the group, was held January 6-10 at Purdue.

A full afternoon session was given over to a "Questions and Answers" forum on general household pests. Questions were mimeographed in advance and distributed among attendees at the start of the conference for study, thus adding to the sum total of useful information.

Two inspection trips formed part of Monday's session, one an industrial plant job, the other on termites. Other features of the program included showing of a motion picture "Block That Termite," a review of pest control literature, and a discussion of the "Fundamentals of Advertising."

Annual banquet was held Thursday evening, with Dr. Edward C. Elliott, Purdue president, in his familiar role of toastmaster.

Nopco's Bonus

For the thirty-third consecutive year, Christmas bonus checks ranging up to $50 were distributed in mid-December by National Oil Products Co., according to Charles P. Gulick, president, and chairman of the board. The custom has been followed since the company was established in 1907, with all employees participating except officers.

CHARLES P. GULICK

"Through depression and prosperity; wartime and peace, we have never permitted a Christmas holiday season to go by without tangibly showing our appreciation to all our loyal employees," Mr. Gulick said. "We hope that time will never come."

Yucca Fiber

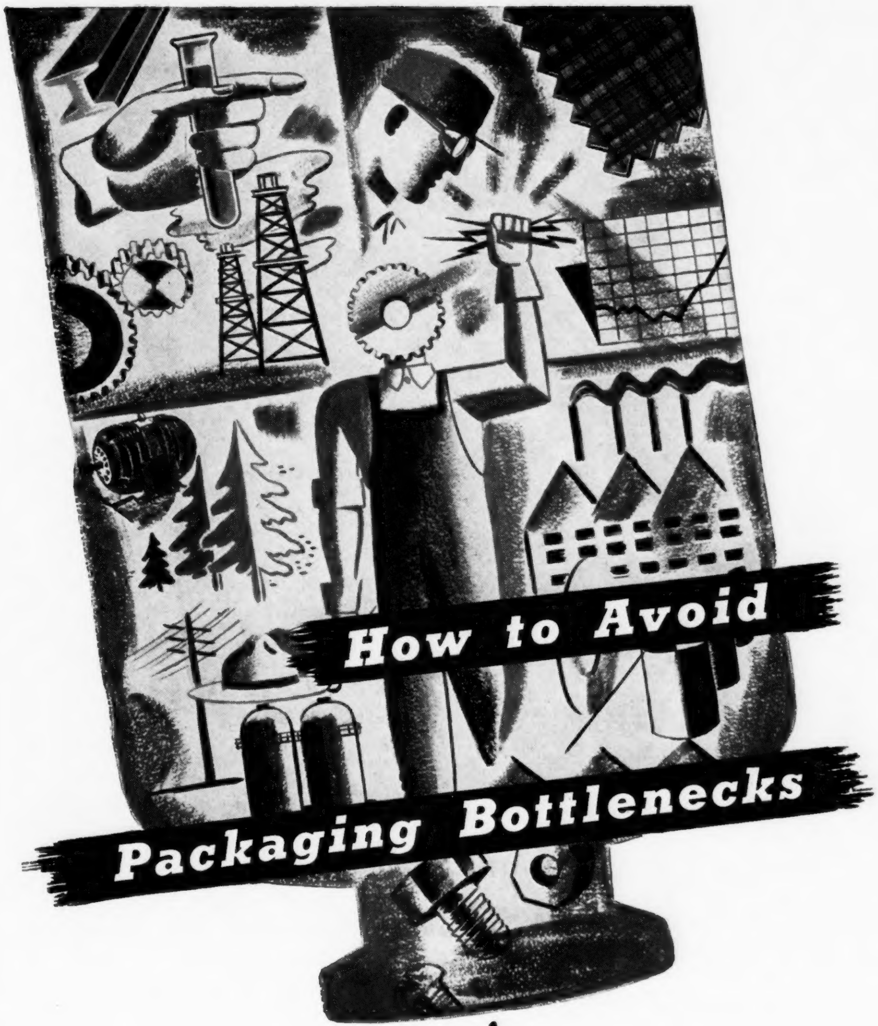
General Fiber Products Corp., recently organized in Los Angeles, is planning construction of a plant which will produce 15 tons of fiber from Yucca perday, according to C. L. Wells, president. Yucca, a desert cactus plant, is found throughout the Southwest, and this production is expected to replace imported fibers.

In manufacturing this fiber, there will be a by-product powder, which has already been found very satisfactory as an industrial cleansing agent, and investigation is now under way to determine its use also in the production of plastics.

Continental's Expansion

The $25,000,000 expansion and improvement program undertaken by Continental Can is expected to be reflected in the company's business during 1941, J. F. Hartlieb, president, declared in his year-end statement.

Among the many manufacturers of automotive specialties exhibiting at the Automotive Accessory Show held at Navy Pier, Chicago, was Zecol, Inc., whose attractive booth is shown above.



Perhaps you've faced the problem already. If not, you're quite likely to meet it soon. Packaging requirements geared to less-than-capacity production can constitute a serious "bottleneck" when called upon to meet the cry of "More! Faster!"

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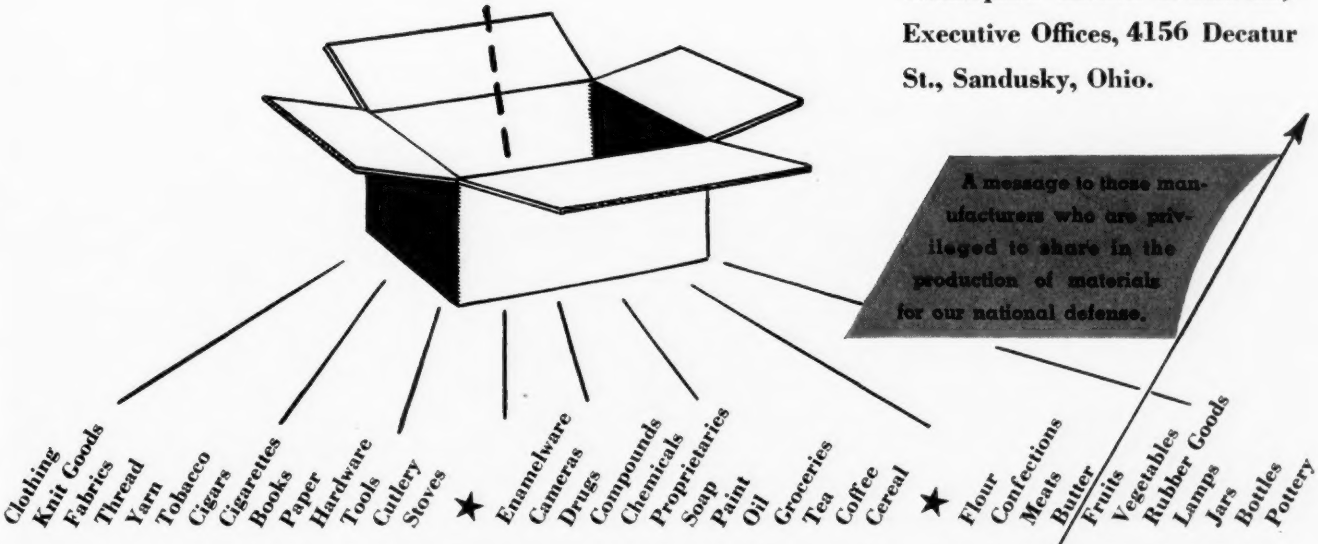

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Washington

By

MACK H. WILLIAMS

THE bold naming of the Axis nations as America's enemies in President Roosevelt's speech last month was followed by significant moves involving future Administration policy toward industry.

The country's status in the war is henceforth to be so advanced as to require virtually war-time footing. After a year of indecision and debate, the Administration is ready to issue orders to business to fall into the line charted for it.

The President served notice that "those who fear the future consequences of surplus plant capacity" will be regarded as blocking the defense effort. That part of his speech is the keynote for 1941.

Mack Williams

While his predeliction for compromise may temper the policy, Washington observers agree he will reject the business viewpoint that defense needs can be met through present plant capacity if non-essential production is curbed.

Administration officials are said to believe that tight situations in the chemical industry could be solved if defense meant nothing more than a 2,000,000-man army and the necessary equipment and auxiliaries.

Steps taken to date to assure adequate supplies of ammonia, cotton linters, nitric acid and toluol would prove sufficient in that event. However, the President's designation of the United States as the "arsenal for the democracies" is likely to impose severe strains on the industry. The problem of plant expansion is squarely before it.

New Dealers from the President down are inclined to give business every chance to increase output on present plant capacity, but strong measures are ready for the moment when production becomes inadequate.

"Two or three" armament manufacturers investigated for several weeks may give the President his first opportunity under the law passed last summer to confiscate uncooperative plants.

The sentiment in Administration circles for building government steel plants if steel refuses to expand is likely to be broadened to cover chemicals, if a reluctance is encountered from that quarter.

The reaction of the industry's observers in Washington to these developments in sentiment has been to point out the wholehearted cooperation which chemical producers have shown.

Operation of government built plants without profit and investment of corporation funds in expansion without any assurance of return are only two examples of the industry's attitude up to now.

They point out, however, that government subsidization for all new chemical plants may be necessary when combat weapon construction gets under way. The strain on chemical capacity then will require expansion on a scale which will make the present one seem insignificant.

Although the Administration recognizes manufacturers should not be compelled to tie up funds in a smokeless powder plant that may become unnecessary overnight, it still regards such items as sulfuric acid as belonging to a class that does not need assistance.

Appointment of the four-man office for Production Management as a super-defense board is valuable more for the effect on public opinion than anything else.

It is becoming clear that the President's selection of Knudson, Hillman, Stimson and Knox was intended to convey the impression that the defense effort has been provided with leaders who can cut red tape.

Actually, the new board does not seem cloaked with sufficient power to speed production, except by eliminating some of the delays within the National Defense Commission itself.

The fact that equal voting power was held by the representatives of agriculture and consumers in the commission made for frequent bickering when matters arose which production experts like Knudson and Stettinius were best equipped to handle.

The four-man board is to have authority to override the dissenting defense commissioners in building and locating new plants, selecting the companies to operate them, and meeting non-routine problems.

The key to its status lies in the President's determination to remain "the boss," and his remark at a press conference that production can be accelerated by keeping everlastingly at the problem and pushing people, rather than giving the defense commission greatly increased powers.

The commission will continue to exert a strong influence on prices, with the cooperation of the Office for Production Management.

Defense economists now propose to control prices by controlling the factors that influence prices—supply and demand. Every effort is being made to equalize supply and demand by insuring adequate stocks of necessities and allocating them to defense plants with as little disturbance to prices as possible.

The defense commission has issued a report covering the first six months of operations. Army and Navy contracts have been cleared for spending $3,300,000,000 for ships, $1,500,000,000 for construction of factories and housing, $1,500,000,000 for planes and parts; $600,000,000 for ammunition, $500,000,000 for guns, and $400,000,000 for trucks and tanks.

The contracts call for five smokeless powder and high-explosive plants, six shell, bag and ammunition-loading plants.

Listed among the half-year's accomplishments are expansion under commission auspices of ammonia and ammonium nitrates for powder, and growing stock piles of antimony, rubber, manganese, tungsten, chrome ore and other strategic materials. Domestic output of manganese and mercury has been "encouraged," the commission noted.

On the same day the report was issued, the War Department picked Milan, Tenn., as the site for a $14,000,000 ammunition loading plant to be operated by Procter & Gamble Co., Cincinnati. Sandusky, Ohio, was selected for an $11,000,000 plant operated by Trojan Powder Co., Allentown, Pa.

The War Department in the last month also awarded contracts totaling $7,500,000 for construction of a small arms ammunition plant near Lake City, Mo., to be operated and equipped by Remington Arms Co. under a $73,575,261 contract.

Awarded $105,887,790 in contracts for equipping and operating a small arms ammunition plant at St. Louis, Western Cartridge Co., East Alton, Ill., received an $18,600,000 cost-plus contract to equip and construct the plant, while the United States Cartridge Co. of Baltimore obtained an $87,279,790 award for production and operation services.

Increased by approximately $20,000,000 the original $10,863,000 contract awarded in September for construction of a TNT, DNT and Tetryl plant at Wilmington, Ill. When built, the plant will be operated by Du Pont under a production award of $17,760,000.

H. O. CHUTE

(*Continued from page 31*)

We are not astounded nowadays when we read of some elaborate, automatically controlled and fully instrumentized solvent recovery installation getting back for re-use 97-99 per cent. of the solvent. But considering the status of the art some thirty-six years ago, it seems almost inconceivable that just "brilliant common sense" could have made it possible for Chute to design and install a plant for recovering acetone with a loss of not greater than 1 per cent. The acetone was used by Goodyear Tire & Rubber Company to extract resins from crude rubber. Chute met his guarantees and his plant was accepted. Not satisfied with this he turned around and developed an entirely new and far more efficient apparatus[11] with which to do the extracting. His claim is that most of what we do today could have been done in the old days if there had been any need of it. As he puts it, the only difference is that then "we used brains instead of pushbuttons."

Reducing the evaporation in recovering alcohol from 17 to 13 gallons (over 23 per cent.) per bushel of corn[12] and designing his "loving cup" evaporator were two more examples of Chute's "brilliant common sense." In an ordinary evaporator there are two tube sheets defining a steam chamber. Circulation pipes go through the two sheets. Necessarily some of the circulation must be down as well as up. Therefore, there was commonly a large central tube to provide a down-take. But evaporating space in the evaporator is expensive, and he put the return circulation through air cooled pipes on the outside, which gave the appearance of a "loving cup" and gave the evaporator its name.

Interesting as these examples of Chute's work are, they fail by far to cover all of his accomplishments. An avid reader, he has found time to pick up and retain substantial quantities of data on subjects far from his own field. His knowledge of Spanish fundamental law, for instance, served him well in getting an absent-minded mine owner in Mexico to "cough up" his back pay Chute simply filed a libel and took legal possession of the property, which he returned when his salary had been brought up-to-date. Very few know him as one of the first to produce calcium carbide and other electric furnace products in this country or as an early experimenter in the production of aluminum. But most of his friends—and they are legion—know that he introduced iced tea to a village inn in the English countryside, although it was necessary to procure the ice from the local mortuary before he could demonstrate the proper technique to an astonished, albeit admiring, audience. Fewer know that he once prevented the passage of an act by the Ontario legislature which would have prohibited the "manufacture and/or vending of vinegar containing acetic acid or any compound or derivative thereof."

It is perhaps as the sage of The Chemists' Club that Chute is best known to the younger members of the chemical profession. He is a frequent contributor to the daily press of New York, on such subjects as rapid transit, reform of the currency, admiralty law, and comparative religion. His sharp wit and ready repartee are the bane of the impractical college professors who manage to deliver learned papers on simple subjects by merely wrapping them up in intricate mathematics. One who tried to defend his stand by pointing out that he had found "nothing recent in the literature" regarding the subject on which he spoke, floundered when Chute replied dryly: "I haven't seen anything in the recent literature about Noah and the ark, but that doesn't make it news."

And so it is no wonder that many of his friends, and particularly the younger ones, have sat in awe and listened to Chute discourse on a wide range and variety of subjects: bridge building, electric furnaces, charcoal pig iron, distillation, waste disposal, economics, political science, sociology, history. Hearing him, one is often reminded of a line from Goldsmith's Deserted Village: *The more the wonder grew that one small head could carry all he knew.*

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[1] Chute, H. O.: Fifty Years of Progress. Chemical Industries, *40*, 31-32 (1937).
[2] U. S. P. No. 874,391.
[3] U. S. P. Nos. 896,434; 896,435; 963,275; 1,250,282.
[4] U. S. P. Nos. 890,216; 890,217; 957,495; 1,051,987; 1,196,334; 1,523,755; 1,593,017; 1,673,801; 1,782,713.
[5] U. S. P. Nos. 821,326; 854,791.
[6] U. S. P. Nos. 648,389; 824,906; 835,501; 845,616; 893,784; 895,003; 939,980; 1,002,034.
[7] U. S. P. No. 824,906.
[8] U. S. P. No. 835,501.
[9] Wisconsin v. Chute, 261 Fed. 89.
[10] U. S. P. Nos. 821,326; 454,791.
[11] U. S. P. No. 890,216.
[12] U. S. P. No. 963,275.

1940—CHRONOLOGY

(*Continued from page 25*)

11-13—Dr. H. C. Urey, Columbia, awarded Davey Medal of the Royal Society—Merck completes plan for control laboratories—H. R. Interdonati joins S. B. Penick & Co. sales division—Dr. F. C. Frary, director of research, Aluminum Co. of America, is new president of the A. I. Ch. E.—"Chem. Engineers" hold most successful winter meeting at New Orleans—W. J. Zick, Stanco, reelected president, National Association of Disinfectant & Insecticide Manufacturers at winter meeting in N. Y. City—War Department announces transfer of funds to rehabilitate nitrate plant No. 2 at Muscle Shoals. Plant will be equipped to produce ammonia—Du Pont reports domestic production of potassium cyanide—Paint and varnish industry jobs defined by N. Y. State Employment Service—Arthur W. Steudel elected president, Sherwin-Williams; George A. Martin becomes chairman of the board after 18 years in the presidency—Carbide to build huge plastics plant at Bound Brook, N. J.—No seasonal let-up in demand for chemicals and raw materials—President Roosevelt vetoes Walter-Logan Bill and House sustains killing of measure designed to control numerous regulatory bodies that have been created in great numbers in last eight years—Penn Salt Manufacturing starts plant to make chlorates at Portland, Ore.—A. C. S. names Dr. Harry N. Holmes, Oberlin College, as president-elect for '41—Paint industry announces plans for financing cooperative advertising campaign—W. J. Austin, president, The Austin Co., killed in plane wreck at Chicago—Manufacturing Chemists' Association issues first edition of "Chemical Facts and Figures, 1940"—most complete statistical picture of the industry ever assembled—Dr. E. C. Williams discusses synthetic glycerine from petroleum at A. I. Ch. E. New Orleans meeting—Chemical exports in Jan.-Oct. 1940 period reach $185,734,116, as compared with but $128,383,839 in corresponding '39 months—New I. C. C. "regulations for transportation of explosives and other dangerous articles" published—Government stock piles of strategic materials have not grown as fast as expected.

FOREIGN DIGEST

(*Continued from page 58*)

In 1940 the Institute synthesized more than 20 different plasticizing agents with high dielectric properties and chemical stability, to be tested in plastics.

Vinyl formate was produced from acetylene and formic acid by the vapor phase method. A thermo-insulation material (asbothermite) is produced from glyptal resin.

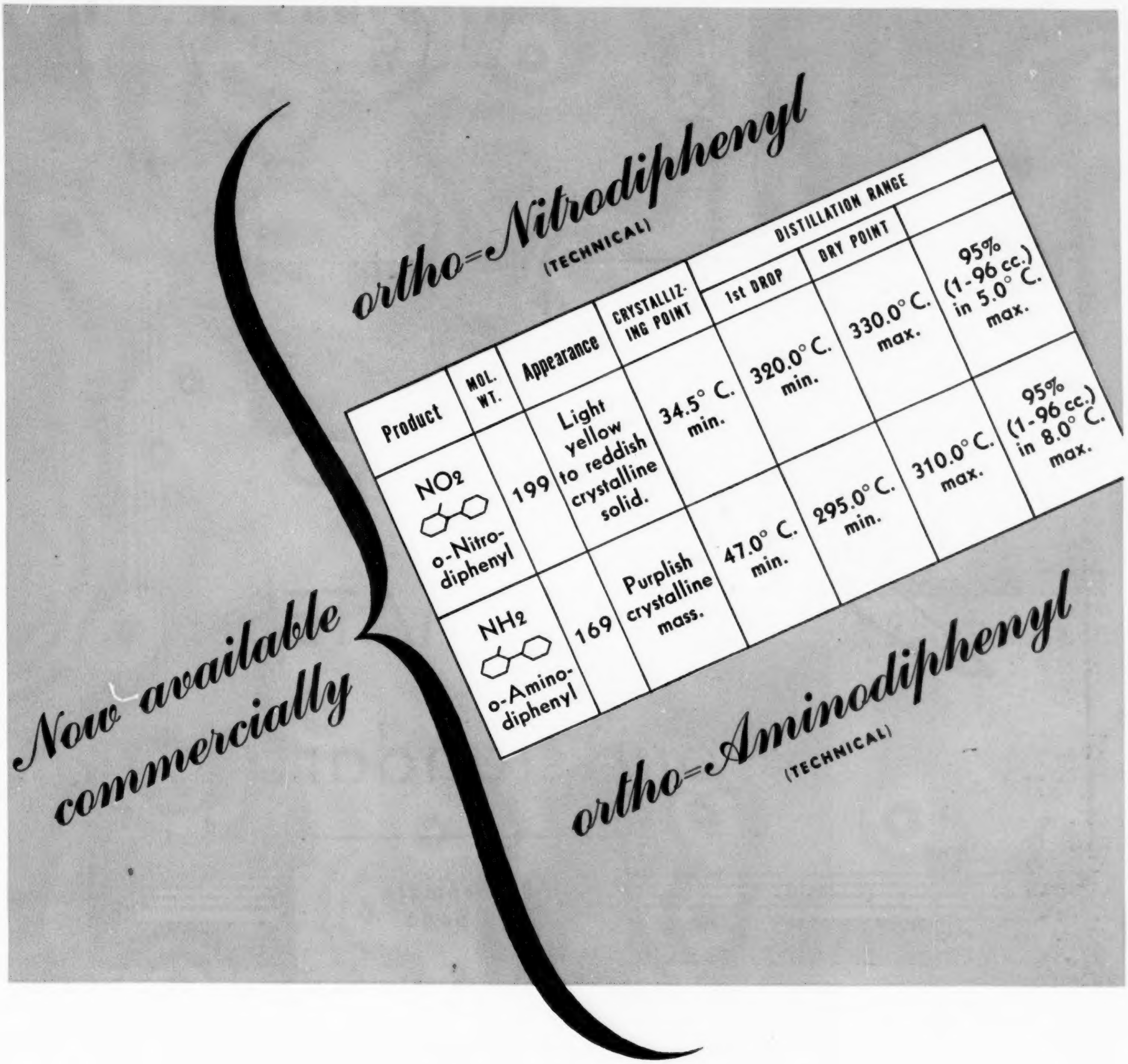
Asbonekorezite was also produced.

Anti-corrosion materials such as vinyl lacquer replaced lead in certain equipment. Work is also being done on the development of chemically stable vinyl sheet and pressed materials. These resins are not affected by dilute nitric acid or alkalies.

Samples of asbopekolite do not alter in the least after 16 months of contact with 40° Be sulfuric acid and 13° Be hydrochloric acid.

Anti-corrosion lacquers made from oxidized petroleum bitumen were studied.

Research was conducted on the physical properties of the different plastics.



Product	MOL. WT.	Appearance	CRYSTALLIZ-ING POINT	DISTILLATION RANGE 1st DROP	DISTILLATION RANGE DRY POINT	DISTILLATION RANGE
NO_2 o-Nitro-diphenyl	199	Light yellow to reddish crystalline solid.	34.5° C. min.	320.0° C. min.	330.0° C. max.	95% (1-96 cc.) in 5.0° C. max.
NH_2 o-Amino-diphenyl	169	Purplish crystalline mass.	47.0° C. min.	295.0° C. min.	310.0° C. max.	95% (1-96 cc.) in 8.0° C. max.

The chemical configurations of *o*-Nitrodiphenyl and its reduction product, *o*-Aminodiphenyl, suggest a number of possible uses as intermediates in the synthesis of dyestuffs, insecticides and plastic compositions.

The amino compound will give any of the characteristic reactions of an aromatic primary amine. It may be considered where a weighted aniline is indicated to obtain certain desired results.

The current prices of 6¢ a pound for the nitro and 12¢ for the amino compound compare favorably with other materials of similar chemical reactivity.

Both of these compounds are available in commercial quantities. Requests for samples are invited. MONSANTO CHEMICAL COMPANY, St. Louis, U. S. A.

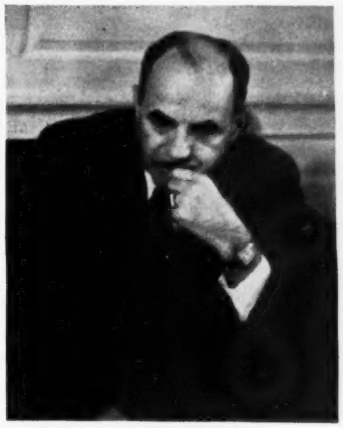
MONSANTO CHEMICALS
SERVING INDUSTRY...WHICH SERVES MANKIND

N.A.I.D.M. Convention

John Powell (left) John Powell & Co., re-elected treasurer of the National Association of Insecticide and Disinfectant Manufacturers, checks with David C. Hoyer in charge of registration at N. Y. City convention.

W. J. Zick, Stanco, Inc., was re-elected president at recent N.A.I.D.M. convention

Above—W. H. Morrow, Canada Rex Spray Co., journeyed from Toronto to attend conclave. Right—Dr. O. F. Hedenburg, Rex Research and Mellon Institute.



A. Edison Badertsch, McCormick & Co., is chairman of the important Insecticide Scientific Committee.

Above—John H. Lawson, Federal Varnish, and R. J. Prentiss, R. J. Prentiss Co.

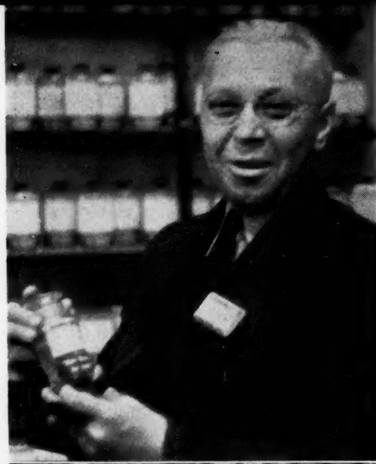
Left—W. W. Allen, Dow, was among the attendees.

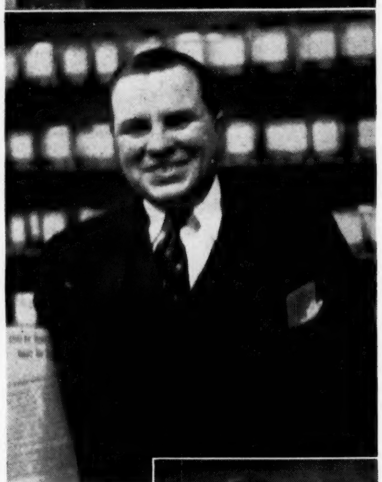
Below—Fred Fletcher, Dow Chemical, A. H. Goddin, DuPont, and Marvin J. Rolstad, U.S.I. Chemicals, look over a report given to the association.




"New Chemicals for Industry"

***Chemical Industries'* display of new chemicals developed by its advertisers in the last three years attracted an enthusiastic group of distinguished visitors at the National Chemical Exposition, Hotel Stevens, Chicago, Ill., Dec. 11-15. This was the first time that this highly instructive exhibit has been shown in ths Mid-West. Every visitor received a copy of a special supplement, describing in detail the 501 chemicals on display.**



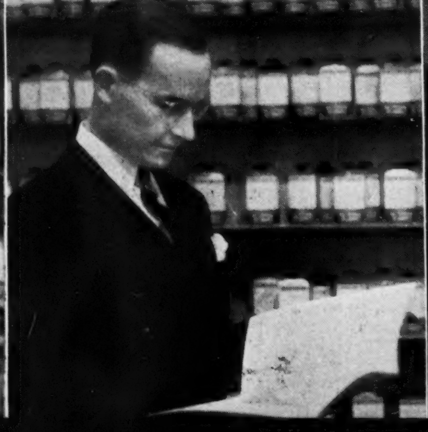



A number of Dow Chemical executives attended, including, above, left to right, Dr. E. C. Britton, Dr. W. Hirschkind, Dr. William J. Hale, and at the right, Dr. W. R. Veazey.

Left, top, Dr. Jacque C. Morrell, Associate Director of Research, Universal Oil Products; Charles L. Gabriel, Manager, Market Development Division, Commercial Solvents, and one of the speakers on the National Industrial Chemical Conference Program of the Exposition; A. R. Prout, Corn Products Refining; and Leon W. Miller, Sales Manager, Chemical Department, The Barrett Co.

At the top, Dr. Eldon Van Romaine, Technical Director, General Naval Stores Division, Newport Industries; Dr. Gustavus J. Esselen, President Boston firm of consulting chemists and engineers; W. N. Wyatt, Assistant Sales Manager, Westvaco Chlorine Products; and Dr. M. Merlub-Sobel, well-known chemical consultant.

Left to right, Dr. Irving E. Muskat, Director of Research, Columbia Chemical Division, Pittsburgh Plate Glass; Charles H. Slater, Division Sales Manager in charge of fine chemicals for J. T. Baker Chemical looks over Chemical Industries' supplement, "New Chemicals for Industry" distributed at C. I.'s booth; and E. F. Wilson, E. H. Haines, Distributing Co., Chicago, poses with E. R. Coyle, Sales Manager, Resin and Solvent Division, Neville Co.


Exposition Booths

Dr. Willard H. Dow, President and General Manager, Dow Chemical, shows Professor C. G. Fink, Head of Division of Electro-Chemistry, Columbia University, New York City, Dow's new Calcium Metal. In the background can be seen Styron coils.

Harshaw Chemical booth drew its share of visitors, attracted by an interesting display of new colors, fungicides, catalysts and fluorides.

Below, Dr. George Goodyear, technical consultant, Mid-Continent Chemicals Corp., exclusive representative for Glyco Products in the State of Illinois, chats with E. Rosendahl in the attractive Glyco booth.

Merck & Co. booth featured the role of pharmaceutical chemistry in national defense.

Victor Chemical Works booth had eye-appeal.

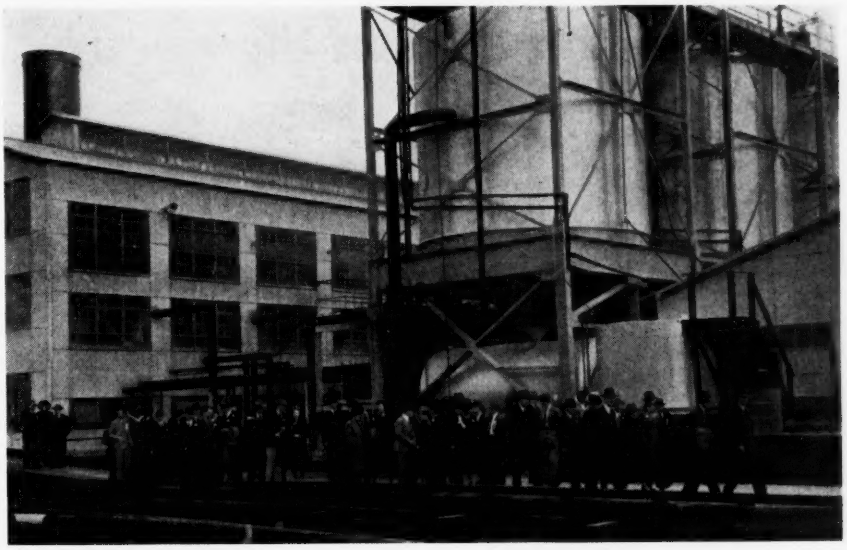
Atlas Powder booth featured industrial organic chemicals, hexahydric alcohols and derivatives, industrial finishes and Darco activated carbons.

NEWS OF THE MONTH

Candid Camera-ing the A.I.Ch.E.

Speakers' table at banquet of the A. I. Ch. E. convention at New Orleans. (L. to R.) Dr. F. C. Frary, research director, Aluminum Co. of America and new president of the Institute; Major General James E. Edmonds, N. G., U. S. A., principal speaker; Dr. C. S. Williams, Jr., Tulane, and chairman of local section; Dr. Webster N. Jones, Carnegie Tech, retiring president, and Mrs. Frary.

Below—Members of A. I. Ch. E. inspecting the Grande Ecaille plant of the Freeport Sulphur Co. during New Orleans meeting.



GOVERNMENT

TVA Ammonia

Tennessee Valley Authority will produce ammonia nitrate in a new synthetic ammonia plant at Wilson Dam, Ala., for which a $6,500,000 contract has already been let to Stone & Webster. Construction of the plant, which will have a capacity of 300 tons a day, will begin shortly.

Construction of the synthetic ammonia equipment to replace the old World War cyanamid process, and rehabilitation of the old ammonia nitrate portion of the plant at Muscle Shoals was delegated to TVA by the War Department with approval of the Defense Commission.

Munitions Projects

Two more major munition plants will be built in Virginia. Hercules has been awarded a contract totaling $6,736,399 for erection and operation of a bag-loading plant near Pulaski, and the Triton Chemical Co., has purchased land at Glen Wilton for a munitions plant following an aerial survey by a company representative and an army engineer.

Nitrate Purchase

Chilean interests report that the U. S. Government has contracted for purchase of 300,000 tons of nitrate, to be held at the disposal of the buyer. About 60 per cent. of the purchase price will be earmarked for exports of machinery from this country, it is understood.

N. A. M. Committee

William Porter Witherow, president, Blaw-Knox Company, has accepted chairmanship of National Association of Manufacturers' Committee on National Defense and Industrial Mobilization. The group will consider virtually every aspect of defense activity.

Subcommittees will be appointed to act as liaison between government agencies and industry; to deal with proposed legislation on national defense relating to industry; priorities; prices; and production.

Nitrogen Plant

The Atmospheric Nitrogen Corp., subsidiary of Allied Chemical & Dye, is reported sending out "feelers" with a view to re-opening its synthetic nitrogen plant at Solvay, N. Y., suburb of Syracuse. Plant was closed about 10 years ago when the Solvay unit at Hopewell, Va., went into production.

Ammonia Project

Defense Commission representative recently journeyed to Minneapolis to discuss the feasibility of establishing an ammonia defense plant in that area.

Sulfur Assurance

U. S. producers are well able to provide adequate supplies of sulfur for thousands of operations vital to the arming of the nation, Langbourne M. Williams, Jr., president, Freeport Sulphur Co., assured in a year end statement contrasting current production with our pitiful lack of this strategic material during old World War days.

ASSOCIATIONS

A. I. Ch. E. Students

The Student Chapters of the American Institute of Chemical Engineers held one of their most successful conventions, when more than 150 members from twelve student chapters gathered at New Orleans on Dec. 5-6. The Student Chapter of Tulane acted as host, assisted by the Louisiana State Chapter. Dr. F. N. Taylor of Tulane's Chemical Engineering Department headed the local committee.

R. W. Greeff & Co., has donated a rolling kitchen, of the type shown at left, to the British War Relief Society. Rolling kitchens are used to feed bomb victims.

Speakers' table at banquet of Synthetic Organic Chemical Manufacturers' Association. (L. to R.) Dr. Ralph E. Dorland, Dow Chemical; Dr. Marston T. Bogert, Columbia, principal speaker, who discussed "Peace Through Preparedness"; Dr. August Merz, Calco, and president, S. O. C. M. A., and Dr. Fred Zinsser, Zinsser & Co.

Below—August Klipstein, American Cyanamid (second from left), joined a group of advertising men at the S. O. C. M. A. dinner, including: R. L. Harmon and Rufus Burnham, Evans, Nye & Harmon, A. P. Howes, president, Howes Publishing Company and N. A. Johnson and M. J. Reeser, American Dyestuff reporter. Standing, at right, is Charles A. Mace, secretary of the association.

Discussion groups were formed where the opportunities for chemical engineers in plant operation, process development, research, and sales were informally discussed by competent industrial leaders.

Perkin Medal

The Perkin Medal, awarded annually by the American Section of the S. of C. I. for valuable work in applied chemistry, will be presented to Dr. J. V. N. Dorr, president, Dorr Co., Inc., and member of the Board of Consulting Editors of CHEMICAL INDUSTRIES, Jan. 10, at a joint meeting with A.C.S., A.I.Ch.E., Electrochemical Society, and Societe de Chimie Industrielle.

Sectional Meeting

About eighty members of the Junior Group of the A.I.Ch.E. from Wilmington and Philadelphia met on Nov. 26 at the U. of Pennsylvania. The main speaker of the evening was Dr. Roland P. Soule of the Tri-Continental Trading Co. whose subject was "An Inventor Looks at Chemical Industry."

Symposiarch's Dinner

The Symposiarch Committee of the Chemists' Club will sponsor a dinner meeting Jan. 22, featuring an address by James Hillier of R.C.A. on the "Electron Microscope."

Bogert Address

Col. Marston T. Bogert, Professor of Organic Chemistry, Columbia, will speak on "Chemistry in our Federal Preparedness Program" at a meeting of the N. Y. Chapter, A.I.C., Jan. 17, at The Chemists' Club.

GENERAL

Phillips' Butadiene

Phillips Petroleum Co. is building a by-product butadiene plant at Borger, Tex., to begin operations early this year. Plant will recover by-product butadiene produced incidentally in the manufacture of neohexane. Output will be used in the manufacture of synthetic rubber by Hydrocarbon Chemical & Rubber, recently organized jointly by Phillips and B. F. Goodrich.

Monsanto Pension

Stockholders of Monsanto Chemical Co. have approved a retirement pension plan for its employees. The amount of the pension when combined with governmental pensions will approach fifty per cent. of average earning for employees of long service, earning less than $3,000 a year. It will supplement pension benefits from the Federal Social Security Act and provides for an increase in the company pension should existing government pensions be decreased or eliminated for any reason.

Penn. Salt Chlorates

Pennsylvania Salt Manufacturing Co. has purchased about 50 acres of land on the Willamette River in Portland, Ore., where it will build a plant to produce sodium and potassium chlorates. It is expected that later the plant will be increased to produce various chemicals by electrolytic and other processes. Chipman Chemical will cooperate in the sale and distribution of sodium chlorate.

Brooks in S. A.

Dr. Benjamin T. Brooks, member of Chemical Industries Board of Consulting Editors has returned to Venezuela after a flying visit during the holidays.

PERSONNEL

Dr. Philip J. Baker, recent graduate of Northwestern, **Dr. Richard S. Egly**, and **Dr. Graham W. McMillan**, both Illinois graduates, and **Dr. Ambrose G. Whitney**, Minnesota graduate, have been added to the staff of the research department of Commercial Solvents. . . . **Clare F. Trombley**, formerly directing sales of Organic Chemicals and Phosphates division products at Everett, Mass., office, has been transferred to Monsanto's N. Y. City district sales office where he will become assistant general branch manager.

Emile F. du Pont has been appointed director of production, Nylon Division, E. I. du Pont de Nemours & Co.; **W. L. Stabler** succeeds him as plant manager at Seaford, Del. . . . **Robert L. Lerch** has been named general sales manager, Haynes Stellite Co., unit of

He *has* to take chances

Your product *doesn't*

A POLICEMAN never knows what dangers may be lurking in the shadows of his beat. He accepts peril, risks his life, takes chances as his duty.

Dangers lurk, too, in the path of every product that is shipped in drums—dangers that may imperil a fine product and a cherished reputation. Yet no chances need be taken. Shipments can be made with safety, with confidence, with no risk to a single drop—in Tri-Sure-equipped drums.

Tri-Sure Closures eliminate all the hazards a shipment can face—tampering, pilferage, substitution, leakage and waste—because the Tri-Sure seal cannot be removed unless it is deliberately destroyed, the Tri-Sure plug is always held tightly in place, the Tri-Sure flange assures complete drainage.

Don't take chances with your next shipment. You don't have to. Ship the *sure* way—the Tri-Sure way—and protect your product, your reputation and your customers. Write today for complete information on Tri-Sure Closures.

Tri-Sure

Reg. U. S. Pat. Off.

CLOSURES

AMERICAN FLANGE & MANUFACTURING CO. INC.
30 Rockefeller Plaza, New York

Robert L. Lerch

Union Carbide and Carbon Corp. . . . **John Ekern Ott** has been named manager of the Archer Plant of Acme Steel. . . . **W. Hansot,** formerly Paris advertising manager of Socony-Vacuum Oil has joined the Aridye Corp., Interchemical subsidiary. . . . **Richard Schmidt,** Niacet Chemical, was elected president, Niagara Falls Industrial Club.

Otto Kessler, formerly with General Chemical, has joined the enlarged chemical division of Foote Mineral . . . **Harry L. Erlicher,** purchasing agent of General Electric has been elected vice-president . . . **L. L. Smith** has been appointed treasurer B. F. Goodrich . . . **Dr. Emile J. Hellund** has joined the technical staff of Battelle Memorial Institute . . . **Orville T. Barnett** has joined the Welding Electrode department of Metal & Thermit Corp., as Engineer of Tests.

Dr. Bruce K. Brown, general manager of research and development, Standard Oil of Indiana, who presided at petroleum symposium of National Industrial Chemical Conference Program held in connection with the National Chemical Exposition.

OBITUARIES

George H. Taber

George Hathaway Taber, 81, retired vice-president of Gulf Oil Corp., and one of the founders of Mellon Institute, died at his home in Pittsburgh.

Mr. Taber was credited with originating many presently well known processes in the field of petroleum refining. While associated with the Atlantic Refining Co., he originated the centrifugal process for removing wax from cylinder stock-naphtha mixtures. His experiments were conducted with the aid of a cream separator purchases from Sharples.

C. Harold Wills

C. Harold Wills, 61, chief metallurgist of Chrysler Corp., died in the Henry Ford Hospital, Detroit. Mr. Wills, a chemical engineer, developed the use of vanadium steel for commercial purposes and of molybdenum steel in automobile construction.

August Kochs, president, Victor Chemical, inspects the National Chemical Exposition and seems delighted with the displays.

Other Deaths

J. Stirling Getchell, 41, founder and president of the advertising agency bearing his name, died in a New York hospital. . . William I. Fansher, 83, founder of Fansher Brothers Soap & Laundry Supply Co., died at his home in Dayton. . . John W. Baynard, 57, plant superintendent, F. S. Royster Guano Co., died in Charlotte, N. C.

PIGMENTS AND FILLERS

See Biggest First Quarter in Years

Contra-Seasonal Demand Pushes through Holiday Season—Most Contracts Call For Increases—Government Lets Contracts on 838,942 Gal. Order—Carbon Black Strong—Casein Firm

THE pigment and filler field is going into the biggest first quarter in many years, if not in the history of the industry, according to reliable informants. Contra-seasonal movement of raw materials into the paint trade has gone on apace, with but a mild slackening over the holiday period.

During the early part of December most factors were busy writing contracts for new year's commitments. This, of course, covers normal spring requirements. Quantities specified in most contracts call for good additional demand over the previous year—this despite that there is a very healthy carry-through which would span the entire winter.

Government contracts were awarded December 9 on the biggest single paint order on record. It called for 838,942 gallons of cream and gray paint to be used in coating army cantonments, and contracts were let territorially to 10 companies. Firms participating are:

West Paint & Varnish Co.; Jaegle Paint & Varnish Co.; Baltimore Paint & Color Co.; Seidlitz Paint & Varnish Co.; Enterprise Paint Manufacturing Co.; Minnesota Linseed Oil Paint Co.; Alston Lucas Paint Co.; Kuhn Paint & Varnish Works; and Socony Paint Products Co.

Important Price Changes

ADVANCED

	Nov.30	Dec. 31
Lead titanate, lb.	\$0.10	\$0.10¼
Lithopone, ordinary, lb.	.0356	.0385
Shellac, bleached, bone dry, lb.	.25	.26
Titanium dioxide, lb.	.13¼	.13½

DECLINED

None

Casein maintained a steady tone throughout, with both domestic and imported material in a favorable position due to diversion of milk to other uses. Another contributing factor is the dearth of space on ships moving to U. S. ports from the Argentine. Whether imports will soften the present structure is a story that will be told within a month or two.

HEAVY CHEMICALS

See Resumption of Upward Curve

Holidays, Inventory Period Slow Up Buying—Contracts Signed By Major Consumers Spread Optimism—Scarce Items Bear Out Forgotten Prediction—U. S. Sulfuric Plants a Possibility

THERE is every indication that the swelling curve of business in heavy chemicals, interrupted by the holiday and inventory periods, will take up where it left off during this first quarter. Forward booking by producers lends support to this opinion. Contracts with major consumers are now signed and in the safe, and delivery time is here.

Defense program is making itself felt in a major way. Already, plating chemicals have felt a squeeze due to high activity in the metallurgical trades. Textile industry, operating at a high level, is also a big factor in chemicals, both present and future. These, of course, are indirect benefits.

U. S. Sulfuric Acid

Directly, the situation is somewhat different. An Army supply officer, addressing the Chemical Salesmen said he, as well as the defense commission, with whom he works closely, expressed extreme gratification with the response of the chemical industry to defense needs. However, he felt that present facilities would hardly be sufficient to supply the quantities of sulfuric acid needed on the armament side of the program and that spent acids would prove to be a problem commanding expert attention. There was a possibility, he declared, that government plants for production of sulfuric and phenol (the latter to use two well known processes) would be necessary in order to assure adequate supply.

Far back—last spring to be exact—when consumers were working off the scare inventories built up during the last quarter of 1939, this department quoted a prediction of one producer that many items would be short before the old year was rung out. At that time, sellers sat around twiddling their thumbs and the forecast was probably received as pleasant in prospect, but improbable.

On Short List

Yet during December, oxalic, chlorates, copper sulfate, anhydrous ammonia, silicofluoride, and practically all the plating group were in better demand than production.

Bichromates staged a revival which gives indications of continuing. Bichromate exports are favorable with some licenses clearing. Alkalies continue strong. Soda ash felt a good call, while caustic was somewhat sluggish, a fact which seemed to alarm no one.

Important Price Changes

	Nov.30	Dec. 31
ADVANCED		
Copper oxide, red, lb.	\$0.19½	\$0.20½
Lead arsenate, lb.	.09	.09½
Manganese dioxide, ton	70.00	71.50
Zinc sulfate, lb.	.029	.030
DECLINED		
Antimony oxide, lb.	\$0.13	\$0.12
Potassium cyanide, lb.	.75	.55

Exports were rather slow. South America, of course, is just getting over the Christmas season. Down there, they start the celebration three days before Christmas and continue on for twelve days. Some orders have been received from Greece.

"Priorities" on Nickel

A search of years for something that was daily being discarded as a nuisance is told in a story about nickel in the January issue of *Priorities*, house organ of Prior Chemical Corporation.

Howard Farkas, sales manager, U. S. Stoneware, snapped just as he exhibits a piece of equipment at the National Chemical Exposition.

First Machinery Increase

First Machinery Corporation has recently granted a ten per cent. general increase to all employees plus a bonus based on seniority.

FINE CHEMICALS

Not a Dull Moment for Producers

Quinine May Get Strong Lift from Army Movements—Clean Handling of Caffeine Situation Laudable—Tartaric Acid at 20-Year Peak—Mercury Position Clarified—Nicotinic Acid Sags

AS far as can be seen from present indications there won't be a dull moment in fine chemical business during the balance of the winter. This is a very conservative statement considering the position of certain items. There is no doubt that with the movement of sizeable Army units to semi-tropical climates, quinine will be taken in unprecedented quantities. And, best opinion holds that this movement probably will start before June rolls around.

The absolute honesty of producers in connection with the caffeine is a bright page in the history of business. While export buyers are crying for material at $8 a pound, manufacturers announced that they would go along with consumers holding previous contracts at $3.25.

Tartaric acid and its derivatives are at a peak untouched since the last war, with no relief in sight.

Seasonal items, narcotics, salicylates, etc., were enjoying a heavy call which is expected to mount for the next few months. Chinese menthol remained firm at a higher level with nice demand. Quinine sales were good, and nicotinic acid proved the lone weak sister, sagging slightly in mid-month.

A good deal of confusion reigns in the mercury market. Buyers shopping around report that the weight is all on their side. On the other hand, producers report a reluctance to do business in quantity at present market level. Our vote goes to the producers in this situation.

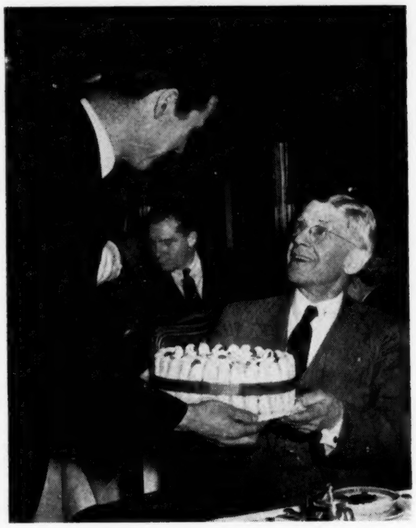
There is talk of a European market of $250 per flask. This, it is assumed, is Spanish or Italian metal. But $250 in what? If Spain and Italy sell to Germany price consideration can be tossed out the window immediately.

Important Price Changes

ADVANCED	Nov.30	Dec. 31
Acid tartaric, USP, lb. ..	$0.43¼	$0.46¼
Ethylene dichloride, lb. ..	.0595	.0693
DECLINED		
Mercury, 76 lb. flask	$170.00	$163.00

Japan is buying Mexican metal at above $190, but this is because her source of supply is limited to one market. Therefore this is another fictitious price.

Contrasted with these figures, the market in London as these words are written is $170, and that is just where American mercury is going within the next few months if government orders maintain their present rate. The days of $200 metal are over.



Henry S. Conrey, retiring manager of Arsphenamine sales division of Merck, was presented with a festive cake by the Pennsylvania R. R. on the occasion of his final trip from Philadelphia to Rahway, after ten and a half years of commuting.

COAL TAR CHEMICALS

First Petroleum-Toluol Plant in Production

New Process Material Causes No Concern Among Coal Tar Suppliers—Total Production of Both Types Seen Needed—Canada in Market—Benzol Position Shaky—Xylol Is Firm

FIRST of the toluol from petroleum units goes into commercial production in mid-January with an estimated output of 2,000,000 gallons annually. It hasn't caused any worry among coal tar producers, however, as the feeling is generally held that the government will need all that the country can produce when its armament program gets into its normal stage. And with construction of explosives plants being rushed, it is believed this stage will be reached earlier than it was anticipated in most quarters.

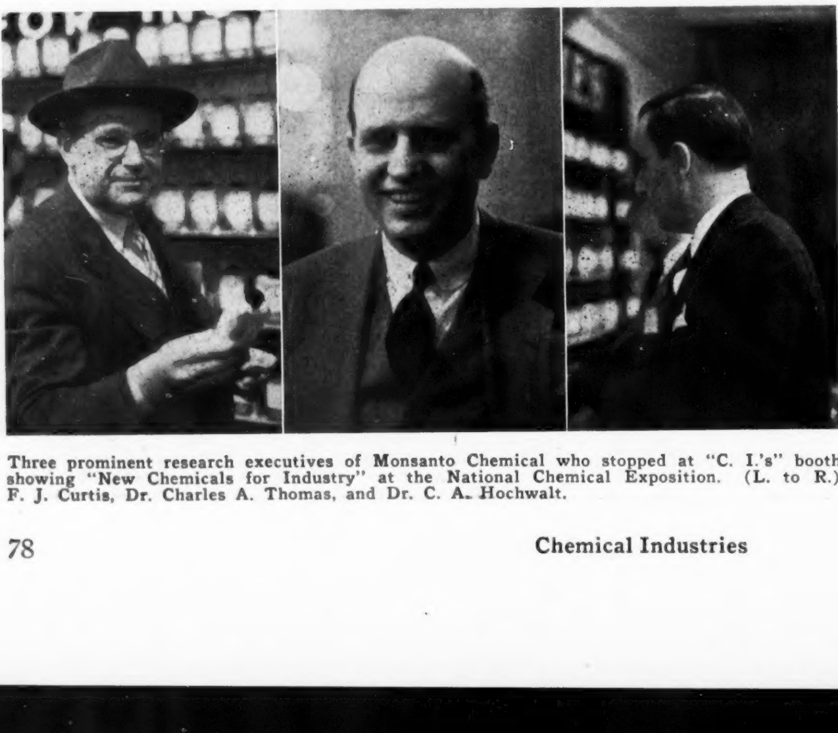
Important Price Changes

ADVANCED	Nov.30	Dec. 31
None		
DECLINED		
Paranitroaniline, lb.	$0.47	$0.45

During period under review, toluol showed its usual strength with supplies adequate. The lacquer trade is taking good quantities, and shipments are moving with satisfying regularity. Best opinions hold that Canada will open into a good market when its new explosive industry gets into stride. Some material has already gone there, through orders placed by the British Purchasing Commission.

Benzol went well—for benzol—during December. With the high rate of production, however, it remains in a somewhat precarious position. While no easiness has developed pricewise as yet, the situation will bear watching.

Xylol shipments went out steadily to the automotive lacquer trade. This material seems in for a serene stretch with a nice balance between orders and output.



Three prominent research executives of Monsanto Chemical who stopped at "C. I.'s" booth showing "New Chemicals for Industry" at the National Chemical Exposition. (L. to R.) F. J. Curtis, Dr. Charles A. Thomas, and Dr. C. A. Hochwalt.

SOLVENTS

Backlogs Forecast for First Half

Buyers Press For Delivery on Scarce Material—Delayed Shipments Expected Until Expansion Moves Materialize—Entire List Short—Price Rise Ignored—Petroleums Sold Up

DESPITE expanded production by many factors, it begins to look as though backlogs will be the rule during the coming months in solvents. Buying is at a capacity rate in a broad range of markets. Shipments are going forward steadily from production, with consumers leading suppliers a merry chase in their demand for deliveries.

Price rises covering almost the entire list had no effect on the enthusiasm of buyers. Acetone is among the volume leaders and greater production is being rushed by one of the largest factors in the field. Petroleum solvents remain on a sold up basis. Producers of these materials are engaged in expansion programs with guaranteed markets for new material as soon as it becomes available.

Important Price Changes

ADVANCED

	Nov.30	Dec. 31
Acetone, tks., lb.	$0.05	$0.06
Amyl acetate, tks., lb.	.095	.105
Butyl acetate, tks., lb.	.08	.09
Butyl alcohol, tks., lb.	.08	.09
Isopropyl acetate, tks., lb.	.06	.065
Isopropyl alcohol, ref'd, 91%, lb.	.65	.66½

DECLINED

None

As reported here last month, the government is not in the market directly. Quantities of solvents no doubt are being used indirectly in the defense program through chemical process industries and the automotive and rubber trades, however.

Outlook Bullish

Outlook for alcohol solvents is bullish with construction being rushed on huge smokeless powder plants. While this is but one of the uses contributing to the nice picture on these items, there can be no question that these plants will be using processing alcohol on an entirely new scale.

The pinch in the solvents market is likely to make insistent buyers uncomfortable until next summer, at least. By that time, authoritative quarters feel that new production will materialize in quantities sufficient to strike a balance with demand—barring complications.

There is no export market in the present picture of any consequence. However, inasmuch as inquiry is slight and no premium buyers have as yet come to light everyone is just as happy. Some plastic solvents are moving to Canada, while acetone is getting a bit of a play from South America—not much.

Hercules' Esters Reduced

Prices on rosin esters have been announced by Hercules Powder Company, effective January 1, as follows: Abalyn, methyl abietate, 7 cents; Hercolyn, hydrogenated methyl abietate, 11 cents; Flexalyn, diethylene glycol di-abietate (80% solution in xylene), 12 cents; Pentalyn, a pentaerythritol-abietate resin, 10½ cents and Pentalyn G. higher melting pentaerythritol abietate, 12 cents.

Koppers Subsidiary Liquidated

The Wood Preservice Corp., former Koppers Co., subsidiary, has become an operating and sales division of the parent company after a recent meeting at which it was voted to liquidate the corporation.

"Witcombings" Feature

The latest issue of "Witcombings," publication of Wishnick-Tumpeer, Inc., tells how carbon black is used to banish the annoying "clicks" in phonograph records.

RAW MATERIALS

Strong Underlying Factors Seen in Market

Imported Oils Technically Sound, as Shipping Space Limits Supply—Chinawood Up—Waxes Easy—Shellac Drops on New Crop Report—Edibles Buoyant—Naval Stores Loans Fixed

BUSINESS was easy in the market for raw materials during December so that the holidays had little effect. One strong item which went into the month on the bullish side was dehydrated castor which is finding favor as a substitute drying oil. General tone of the market remains firm with all indications pointing toward moderate advances in the general list.

Imported oils in the face of light volume remain technically sound. Offerings are necessarily light, and in some cases buyers are required to shop around to fill their needs. Shipping space on boats from South America is limited which complicates the supply situation. Both oiticica and perilla are cushioned by this short position.

Chinawood was up a half cent at month's end due to shipping charge increases. Inquiry is fair with transactions few.

Waxes fell prey to an easy tendency, with most grades of carnauba slumping, and candelilla soft on spot. However, with waxes finding their proper levels, a firming up is due, with fewer "insides" prevailing in the market. Most factors are in agreement that the position is healthier as a result.

Important Price Changes

ADVANCED	Nov.30	Dec. 31
Oil, Chinawood, tks., lb.	$0.25¾	$0.26¼
Corn, crude, tks., lb.	.05½	.06⅛
Linseed, raw, tks., lb.	.081	.084
Peanut, crude, dom., tks., lb.	.05⅛	.05¼
Soybean, crude, dom., tks., lb.	.04¾	.06¼
Turpentine, gal.	.43½	.45¾
DECLINED		
Wax, Carnauba, lb.	$0.73	$0.69
Japan, lb.	.18½	.18

Shellac suffered a reaction in Calcutta after coming into the month in a seemingly impregnable position. This was based on reports that the new crop would show a 50 per cent. decrease under last year. A check of sellers reveals that a good portion of the 1941 contract business was closed on the bulge, with commitments presaging a first quarter well above last year.

While no serious break has occurred in the market, prices are off about 1c from the level reached when buyers rushed in to cover against what looked like a rising market.

Edible oils are firm generally with soybean oil strong, and some mills out of the market. Linseed was fairly active with prices steady.

Naval Stores

As predicted here last month, President Roosevelt recently approved the loan program on naval stores for 1941, with turpentine at 30 cents a gallon in bulk (equivalent to 36 cents in barrels), with a 10 per cent. reduction on all grades of rosin.

This announcement while discounted took precedence as news over the business at the Exchange. Transactions were quiet for the first part of December due to uncertainty over the official loan value. During month's end, there were two four-day vacations, the days in each case being the two days before the holiday.

Turpentine closed the month firm at 31¼c with a few bidders at Savannah. It is felt that the market is in a position to take care of itself, with the defense program being one of the contributing factors. Some material moved abroad during the past month, and shipments have gone to South America and the Far East when cargo space was available. This, however, is but a drop in the bucket of the total potential market.

Rosins slipped considerably. The grapevine on reduced loan values undoubtedly was a contributing factor here.

Philip S. Barnes, sales manager, chemical division, The Pfaudler Co., illustrates the raw material and finished product at Hercules' Hattiesburg plant during A. I. Ch. E. plant trip. On truck are the stumps and in his hand, a bottle of pine oil.

AGRICULTURAL CHEMICALS

Year's End Halts Mixing Orders

Organics in Strong Technical Position as Most Prices Hold—Blood and Tankage Slip as Feed Support Fades—Fish Scrap Scarce—Ammonia Sulfate Higher—Nitrate Situation Hidden

PROXIMITY of year's end is felt in some quarters to be the cause of slackening of early mixing operations indicated in pre-seasonal call for organics last month. While prices clung tenaciously to previous levels in most instances, there was no carry-through of the good business which marked November. These items, however, are looked upon as in a good technical position with all signs pointing toward early emergence from the "buyers' football" class.

Ammonia sulfate remains where it has been since fall. It is being shipped from production on contract, with a long waiting list among steady contract buyers. Export inquiry is still exceptionally heavy. The fact that premium was increased by those seeking export lots, however, is the best indication that very little is getting into hands which would place it on the dock. Scheduled price increase of $1 per ton went into effect for the first quarter.

Important Price Changes

ADVANCED	Nov.30	Dec. 31
Ammonia sulfate, ton	$28.00	$29.00
Hoofmeal, unit	2.20	2.50
DECLINED		
Blood, dried, dom., N. Y., unit-ton	$2.50	$2.40
Tankage, N. Y., unit-ton	2.50	2.45

Nitrate of soda has not felt its seasonal call as yet. While supplies right now are considered adequate, some interesting developments may be uncovered about a month from now.

Potash items will get a breathing spell for a bit. Most of the early season shipments have been cleared, but there is likely to be a better than normal demand for replacement material, as indicated by heavier deliveries requested by consumers. Certain salts remain in their previous short position.

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U.S.I. CHEMICAL NEWS

January ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1941

New Preparations Help Industry to Avert Dermatitis

Dibutyl Phthalate and Acetone Employed in Protection of Skin

Possibility of increased protection against some forms of industrial dermatitis is indicated by studies recently reported. A preparation recently patented is said to be especially advantageous in protecting the skin against exposure to chemicals such as those encountered in photographic developing solutions, and to be useful also as a safeguard against mustard gas irritations, in covering skin blemishes, and as a base for make-up.

Uses High Boiling Solvent

The preparation, it is said, consists of a cellulose ester, a vegetable oil or animal fat, and a high boiling solvent. Suitable solvents are said to include dibutyl phthalate, butyl stearate, and diglycol laurate.

Protection against dust-borne irritants is afforded by a non-greasy preparation which

(Continued on next page)

Acetylates Oiticica Oil To Produce Tough Films

LOUISVILLE, Ky.—Acetylation of oiticica and similar oils results in a marked improvement in drying properties, according to a patent issued to an inventor here. Acetylated oiticica oil, it is claimed, will dry to a smooth, tough, glossy film in 15 minutes without the use of driers. It is said that the process overcomes the tendency of the raw oil to produce wrinkled or frosted films on drying. It is reported that the process can be carried out by refluxing the oil with acetic anhydride, preferably with the addition of a small amount of sodium acetate.

The acetylation process, it is claimed, possesses advantages over cooking treatments for improving oil properties.

A tentative standard method for determining the water vapor permeability of paper and paperboard is described in a recent report. U.S.I. will gladly refer readers to a source from which the report may be obtained.

Tells How to Make Paint To Cover Creosoted Wood

INDIANAPOLIS, Ind. — Creosoted wood can be painted with a new coating composition that is not attacked either by the creosote or by the elements, it is claimed by an inventor here, who has received a patent on the method.

Essentially, the composition is said to consist of a phenol-formaldehyde resin in a volatile solvent, preferably with a catalyst that speeds up setting of the resin. Oxalic acid is suggested as a catalyst. The coating, according to the inventor, may be a clear varnish, or fillers and pigments may be added. He states that the resin, as used in his process, is insoluble in creosote once the resin has set, and that the creosote therefore does not bleed through.

A suitable solvent is said to consist of a mixture of ethyl alcohol and butyl alcohol.

Ethyl Alcohol and Butyl Alcohol are produced by U.S.I.

New Special-Purpose Adhesives Cover Broad Application Range

Non-Aqueous Types, Employing Organic Solvents, Undergo Rapid Development as Adhesion Problems Become Increasingly Complex

"Making things stick" has developed in the last few years into a highly specialized and complicated industrial problem. Industry today finds it necessary to effect the adhesion of rubber to metal, cellophane to cellophane, plastics to plastics, plastics to metal, and many other combinations. Most of the special-purpose adhesives that have been developed to meet these requirements make extensive use of organic solvents, many of which are produced by U.S.I. While aqueous adhesives account for the major part of the total volume used, the non-aqueous types are usually more adaptable to specialized purposes.

The growing importance of special-purpose adhesives is shown by the many new ones recently placed on the market: a cement for making chemically resistant joints between rubber and metals; a liquid for attaching markers of glass, metal, plastics, or porcelain to any surface; a cellophane cement described as especially suitable for sealing food packaging; another adhesive resistant to dilute acids, alkalis, grease, and oils; still another that develops tensile strengths as high as 700 pounds per square inch.

Lacquer Adhesives

Lacquer-type adhesives can be made largely from U.S.I. products. These adhesives employ conventional lacquer materials—cellulose derivative, resin, plasticizer, and solvent—though not in the conventional lacquer proportions. In these lacquers, the solvents, in addition to cting as a carrying vehicle, provide the proper viscosity and evaporation rate.

An interesting example of alcohol's usefulness in controlling viscosity is disclosed in a recent patent covering a transparent adhesive which is said to be suitable for application to paper, leather, glass, cellulose esters, and cellulose ethers. The patent lists two typical formulations:

	Parts by weight Example 1	Example 2
Milled latex crepe	250	250
Ester gum	175	175
Anti-oxidant	1.25	1.25
Heptane	2500	1550
Alcohol	—	15.5-31

(Continued on next page)

Says Dialkyl Phthalates Improve Lubricating Oil

ELIZABETH, N. J.—Lubricating oils of superior load-carrying capacity and decreased tendency toward oxidation and carbon formation can be prepared by incorporating small amounts of the dialkyl esters of phthalic acid, according to a patent granted to an inventor here.

Dimethyl, diethyl, and dibutyl phthalates were all found to effect substantial improvements in loads carried and a considerable decrease in oxidation rate, the inventor claims.

It is said that the phthalates may be added to the lubricating oils used for automobile engines and for various industrial purposes, or may be included as an ingredient in grease compositions.

Dimethyl, Diethyl, and Dibutyl Phthalates are produced by U.S.I.

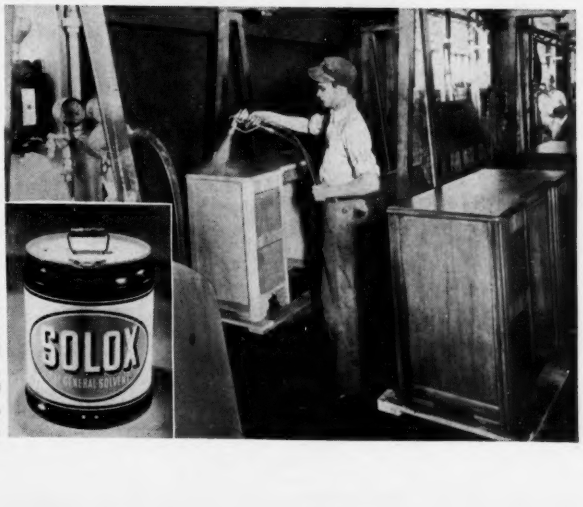
Suggest Way to Produce Low-Gloss Manila Films

BROOKLYN, N. Y.—That the gloss of Manila resin films can be reduced when desired by the addition of a diatomaceous earth was recently reported here.

The addition of 8% of the diatomaceous earth, based on the weight of resin present, resulted in a film of medium gloss, while a 15% addition gave a flat film, it was said.

A suggested method of preparation is to begin with a 50% concentration of Manila in ethyl alcohol. A paste is then prepared by using the diatomaceous earth and a portion of the Manila resin solution. The paste is then ground in a pebble mill and the remainder of the Manila solution added.

Manufacturers of lacquers and varnishes find Solox, U. S. I.'s proprietary alcohol-type solvent, a valuable aid in the formulation of superior products that meet modern finishing requirements. Solox is extensively employed in the manufacture of nitrocellulose lacquers and spirit varnishes and in cutting and thinning shellac. A mixture of 20% Solox and 80% toluol is regarded as one of the most satisfactory solvent combinations for ethyl cellulose, resulting in low-viscosity solutions and superior films. Solox has a mild, non-residual odor, and is economical to use. It is available in both 190 proof and anhydrous grades. It is obtainable without special permit.



January ★ **U.S.I. CHEMICAL NEWS** ★ 1941

Alcohol-Ethyl Acetate Mixture Believed Best For Coloring Textiles

DERBY, England—That a mixture of ethyl alcohol and ethyl acetate has outstanding advantages in the dyeing of cellulose acetate and other cellulose derivatives is disclosed in a U. S. patent granted to an inventor at Spondon, near here.

The alcohol-ethyl acetate mixture, says the inventor, is an excellent solvent for cellulose acetate dyestuffs, and is useful in the coloring of rapidly running threads. A particularly desirable mixture, it is claimed, has the following proportions:

	Parts
Ethyl acetate	40
Absolute alcohol	60
Water	20

A wide range of dyestuffs can be used with this mixture, it is said.

Ethyl Acetate and Absolute Alcohol are produced by U.S.I.

Describes Solution for Treating Galvanized Iron

NEW YORK, N. Y.—How cleaning and etching of galvanized iron, preparatory to finishing, can be carried out in a single step was recently described in *Metal Industry*.

The following solution, it is claimed, can be used satisfactorily:

	Parts by weight
Alcohol	60
Toluol	30
Carbon tetrachloride	5
Hydrochloric acid (concentrated commercial grade)	5

The solution, it is said, is freely applied to the galvanized iron with a brush.

New Skin Protectives

(Continued from previous page)

is brushed onto the skin, according to foreign investigators. A typical composition is said to consist of:

	Parts
Ethyl cellulose	5
Mastic	8
Castor oil	1
Acetone (technical)	86

It is said that preparations of this type are useful when it is desired to avoid risk of soiling materials or objects.

Dibutyl Phthalate and Acetone are produced by U.S.I.

Plastic Tees Glow in the Sunlight to Aid Golfers

CHICAGO, Ill.—Golf tees are now being molded of cellulose acetate incorporating a fluorescent yellow pigment, it is reported here. Under the ultra-violet rays of the sun, the pigment is said to glow brilliantly, so that the tee is easy to find.

Special-Purpose Adhesives Employ Many U.S.I. Products

(Continued from previous page)

The relatively small amounts of alcohol shown in Example 2 allow very substantial savings in the quantity of heptane used. The alcohol, according to the inventor, is extremely effective as a viscosity-reducer.

Cellulose Acetate Films

The wide use of materials such as cellulose acetate has led to the development of a relatively new type of adhesive, the solvent cements. These adhesives are in reality assistants. They act to soften a coating already applied to the surfaces to be joined, so that the surfaces cement themselves. Cellulose acetate films, for example, can be cemented by using acetone and ethyl lactate. Alcohol is frequently employed as a diluent with strong solvents to prevent complete dissolving of the film.

For Simulated Leather

A novel application of this general type is found in a patented process for simulating the appearance and properties of natural leather by transferring preformed lacquer films to a rubber-impregnated felt base. The films are formed, it is said, on a smooth metal plate and then activated by a mixture which may consist of 5 parts of ethyl acetate, 5 parts of the acetate of ethylene glycol mono-ethyl ether, and 90 parts of 95% alcohol. When the activated films are pressed against the felt base, they are said to adhere smoothly.

Alcohol with Aqueous Adhesives

Even where aqueous adhesives are used, alcohol finds application for special purposes. For example, in securing sheets of paper and aluminum, it is reported that difficulty has been experienced in obtaining proper wetting of the aluminum surface by aqueous adhesives. According to a recent patent, this difficulty is eliminated by treating the surface with a mixture of phosphoric acid and alcohol. The alcohol serves as a grease solvent and also facilitates drying.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

A new pigment is said to be especially suitable for white or tinted exterior enamels where resistance to chalking and fading is of primary importance. The pigment is reported to be of the titanium dioxide type. **(No. 410)**

U S I

A suspension agent is reported to aid in preventing settling and caking of pigments. It is described as a modification of aluminum stearate with a minimum gelling power. **(No. 411)**

U S I

An aluminum-casein paint is said to combine the ability to prime and seal the surfaces of concrete, wood, brick, and plaster. Maker claims that it can be applied over surfaces that have been previously painted, varnished, or enameled, and that it will cover stains and prevent them from bleeding through. **(No. 412)**

U S I

A cement cleaner is supplied in the form of a concentrated powder, it is reported. Maker says that consistent use will not only remove dirt and grease, but will whiten and harden the cement and fill the surface. **(No. 413)**

U S I

A new lacquer is said to be suitable for coating the surfaces of cellulose acetate molded parts. According to the manufacturer, it can be used for both ornamentation and protection, and is made in several colors for dipping or spraying. **(No. 414)**

U S I

A water-treating material is described as an emulsion of plant and vegetable materials. It is said to assist in removing scale-forming impurities from water by depositing them in the form of sludge. **(No. 415)**

U S I

A cleaning agent, said to have been developed originally for washroom equipment and drinking fountains, can be used on a wide variety of materials, including metal fixtures, it is claimed. It is reported to employ a soapless detergent base with a mild abrasive. **(No. 416)**

U S I

A sealing compound of the synthetic rubber type is said to contain no disintegrating resins, asphalt, or putty. Maker says that it may be applied for caulking and waterproofing jobs, and that it adheres strongly to concrete, glass, metal, wood, and other surfaces. **(No. 417)**

U S I

A duplicating film for reproducing drawings is said to be a negative medium that assures true-to-scale reproduction, withstands routine handling, resists dust and dirt. Waterproof treatment is employed to prevent shrinking or expansion, it is claimed. **(No. 418)**

U S I

Cork composition is said to be available in sheet form in several thicknesses. It is claimed that the binder used reduces shrinkage to a minimum, gives high tensile strength, and will not harden or deteriorate. Gaskets cut from the sheets may be stored without change in dimension, it is claimed. **(No. 419)**

(*Continued from page 44*)

permitted to enter and work in or on such equipment. The necessity of having clean tanks is probably more important than having clean containers of other types. A person should not enter a vessel unless someone is on guard outside. If there is a question about the quality of the air within the container, proper respiratory and protective equipment should be worn.

Tanks are used as containers for many chemicals and other materials and it is impractical to set forth a procedure which will fit all cases. However, we can illustrate by describing the recommended procedure for a tank used for storage or processing of acids.

(a) Remove all run-off and entering lines through which there is any possibility of leakage of acid into the tank.

(b) Blank off the end of all inlet pipe lines so as to prevent acid under pressure from bridging the gap and entering the tank.

(c) With some acids such as sulfuric it is possible to have a hydrogen concentration within the explosive range. To reduce the hazard from this source, the vessel should be thoroughly blown out with compressed air.

(d) Maintain a circulation of air through the vessel to prevent the concentration of hydrogen from reaching the explosive range.

(e) Do not use electrical extension cord lamps or portable electric tools in or near tanks, vessels, or equipment where hydrogen is present or its presence is suspected.

If a light is necessary and no flammable vapors are present, use only an approved low voltage extension cord lamp (32 volts or less) or a flashlight approved by the Bureau of Mines or the Underwriters' Laboratories.

Also, exercise special care with tools or other equipment being used to avoid striking or drawing sparks.

(f) Drain the tank until no more acid and mud will run out and remove all mud possible by hoe or other mechanical means.

(g) Wash the tank with as strong a stream of water as possible using a 2 or 2½-inch hose with a nozzle until all mud is removed. Agitation and removal with bars or hoes may be necessary to get rid of heavily caked mud.

Weak acid attacks metal very rapidly; therefore, immediately fill the tank to overflowing with water containing enough soda ash to neutralize completely any residual acid and still maintain the solution alkaline. This is necessary not only to prevent acid drip but to avoid the formation of hydrogen or hydrogen sulfide gas because of the action of dilute acid on the tank metal. The solution should be well agitated in order to reach and neutralize all parts of the tank. Remember that small quantities of hydrogen sulfide gas are quite poisonous.

(h) Thoroughly drain off the solution and then proceed with whatever work or use is required.

If hot work is to be carried out and the vessel is of riveted construction, apply heat to the seams from the outside after the tank has been cleaned. This is to remove fumes from the sulfate which collects in the seams. The procedure just described should be carried out if men are to work inside of the vessel.

If the vessel is to be returned to acid service, complete the repair or other work as promptly as possible and then fill the vessel with acid.

Obviously, tanks used for other chemicals call for an appropriate procedure. For example, if the tank had formerly contained chlorine, it would have been evacuated or blown out until all liquid chlorine had been removed; then dry air would have been blown through the tank for a number of hours in order to remove as much of the residual chlorine as possible. Such a vessel would not be washed out ordinarily. However, washing can be safely carried out by following the procedure just described and then adding sufficient neutralizing solution to minimize attack of the metal. Then wash and dump the vessel several times. After washing and neutralizing, the tank should be pumped or blown out and dried. It is then in order to proceed with such other work as may be required.

A final caution regarding any vessel which has been used as a container for volatile flammable material:—Before men are permitted to enter or to carry out any mechanical work, check the vapor concentration by means of a vapor detector or other suitable means. If the concentration found is unsafe for men to enter or to carry out the proposed work, put the vessel through a cleaning procedure which will make it safe.

Dismantled Equipment

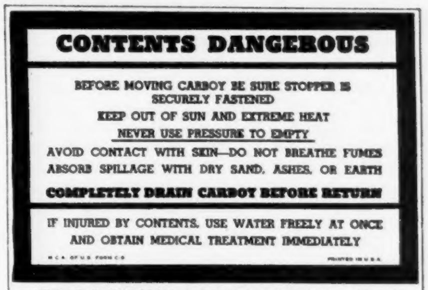
The hazard connected with such equipment is illustrated by a serious accident which occurred several years ago.

A lot of pipe had been removed from a plant manufacturing an explosive material. This material when wet is relatively harmless but when it is dry it is quite flammable and even explosive. This removed pipe was being loaded on a truck. Evidently some of the material in the pipe had dried out and was sensitive to shock. Anyway, the material exploded and four men lost their lives.

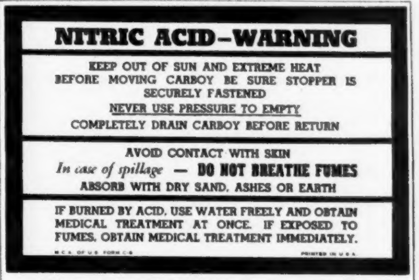
Naturally, not all materials are as potentially dangerous as this particular commodity. However, many are explosive when mixed with air and many are poisonous to a varying degree.

The principle already stated holds good again. Be sure the equipment, whether it be an autoclave, digester, pipe fitting, etc., is properly cleaned.

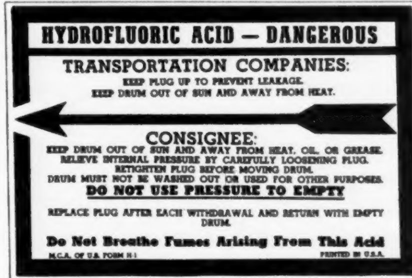
With autoclaves, digesters, tanks and similar equipment, it is usually practical



FORM C-5. FOR CARBOYS CONTAINING AUTHORIZED PRODUCTS EXCEPTING NITRIC ACID.



FORM C-6. FOR GLASS CARBOYS CONTAINING NITRIC ACID.



FORM H-1. FOR RUBBER DRUMS CONTAINING AQUEOUS HYDROFLUORIC ACID.

Another group of M.C.A. labels.

to clean by washing, steaming, neutralizing, or mechanical removal, or possibly a combination of all four methods.

With pipe, valves, cocks, fittings, etc., and similar pieces, like methods may be employed, but due to the design and shape, it is not always possible to clean such pieces completely. Our usual practice is to clean them by one or more of the methods mentioned above or a combination of all of them, but we do not stop there. Such pieces are then sent to the burning ground and a fire built around them. This is usually effective. Valves, cocks, and similar pieces should be taken apart before burning. After cooling, the pieces can be safely worked on or offered for sale.

Everyone who has given thought to the problem of the safe disposal of the equipment realizes that the principle that needs to be kept in mind always is to be sure that the piece or article is thoroughly and properly cleaned. If this is done, the probability of accidents occurring will have been very much reduced.

We have not said much about "disposal" as such, and I intentionally avoided doing so because I think it is obvious that you can very nearly do as you please with all of the containers and objects mentioned if you have them clean of flammable, poisonous, or corrosive materials.

(*Continued from page 47*)

Bureau of Explosives, 30 Vesey Street, New York City, would appreciate information on the numbers of loose leaf copies which are required by each shipper.

New Marine Regulations Become Effective Apr. 8

The Bureau of Marine Inspection and Navigation of the Department of Commerce held a series of hearings from December 9th to 12th and a public hearing on December 13th in Washington on the proposed Regulations for the Transportation of Dangerous Articles by water.

Many associations representing carriers and shippers presented numerous objections for the consideration of the Department of Commerce. They were assured that all objections and suggestions would receive consideration and every effort not inconsistent with safety would be made to issue regulations which will not be burdensome to commerce.

The law requires publication of the Regulations by January 7, 1941, and they become effective on or about April 8, 1941. All shippers of dangerous articles by water should carefully study these Regulations as soon as they are published. Copies can be obtained from the Bureau of Marine Inspection and Navigation, Department of Commerce, Washington.

Lewis-Shepard Device For Handling Drums, Barrels

The Lewis-Shepard Company of Watertown, Mass., have announced a new device for safer handling of barrels and drums. This simple tipper consists of a strong handle with a pronged adjustable collar.

This adjustable collar allows the tipper to fit all types of drums and large or small-bilged barrels. The long handle increases the leverage so that much less effort is required to handle barrels or drums with increased safety. The device works both in tipping barrels from the horizontal to the vertical and the reverse.

Steel Barrel Statistics

Monthly statistics on production, shipments, stocks, and unfilled orders of steel barrels (except beer barrels) and drums of heavy and light types are shown and are the figures compiled by Director William L. Austin, Bureau of the Census, Department of Commerce.

The data in Table 1 for steel barrels and drums of *heavy types* were reported by 32 manufacturers, operating 42 plants, in 1940, in 1939 by 34 manufacturers operating 44 plants, and by 34 manufacturers operating 41 plants in 1938. Production of steel barrels and drums of heavy types for October 1940 amounted to 1,519,624 as compared with 1,305,497 for September 1940, 1,612,384 for October 1939, and 841,653 for October 1938.

The data in Table 2 for steel barrels and drums of *light types* were compiled from reports of 16 manufacturers for 1940, 1939, and 1938. In this group 13 manufacturers also produced heavy types, data for which are included in Table 1.

The manufacturers whose data are included in these statistics (Tables 1 and 2) produced approximately 88 per cent. of the total value of the output of the industry as reported at the Census of Manufactures for 1937.

Table 1.—Heavy Types (Number of Barrels and Drums)[1]

Year and month	Production	Shipments	Stocks, end of month	Unfilled orders, end of month Total
1940				
January	1,137,543	1,158,345	41,708	450,032
February	802,960	808,635	36,033	335,183
March	851,912	853,564	34,381	243,081
April	951,480	949,054	36,807	235,485
May	930,319	916,285	50,841	291,764
June	1,097,836	1,101,901	46,776	376,681
July	1,081,425	1,075,434	52,767	349,951
August	958,120	963,600	47,287	435,616
September	1,305,497	1,298,318	54,466	699,891
October	1,519,624	1,534,378	39,712	430,764
Total (10 months)	10,636,716	10,659,514	....	....
1939				
January to September	7,470,385	7,471,205	....	....
October	1,612,384	1,576,690	66,586	1,147,918
Total (10 months)	9,082,769	9,047,895	....	....
Total (year)	12,188,005	12,158,445	....	....
1938				
January to September	6,096,502	6,062,303	....	....
October	841,653	865,572	36,241	374,454
Total (10 months)	6,938,155	6,927,875	....	....
Total (year)	8,557,174	8,550,299	....	....

Table 2.—Light Types (Number of Barrels and Drums)[2]

Year and month	Production Total	Production Welded side seam	Production Lock side seam	Shipments Total	Shipments Welded side seam	Shipments Lock side seam	Stocks, end of month	Unfilled orders, end of month
1940								
January	248,221	75,951	172,270	246,520	73,191	173,329	40,446	143,286
February	204,398	52,643	151,755	201,514	50,669	150,845	43,330	98,595
March	218,745	58,392	160,353	218,862	58,796	160,066	32,366	44,771
April	261,046	76,334	184,712	261,894	77,223	184,671	42,365	72,613
May	228,005	74,775	153,230	229,944	77,263	152,681	40,426	50,153
June	210,000	76,848	133,152	211,950	79,192	132,758	38,476	71,257
July	229,191	65,529	163,662	230,419	64,922	165,497	34,051	36,758
August	255,682	57,865	197,817	253,389	54,034	199,355	36,344	27,162
September	223,194	61,877	161,317	226,642	66,062	160,580	32,896	16,691
October	256,264	77,670	178,594	255,949	77,404	178,545	33,211	36,930
Total (10 months)	2,334,746	677,884	1,656,862	2,237,083	678,756	1,658,327	....	....
1939								
January to September	1,767,182	520,128	1,247,054	1,733,823	513,611	1,220,212	....	....
October	275,953	110,183	165,770	275,369	109,593	165,776	42,454	271,906
Total (10 months)	2,043,135	630,311	1,412,824	2,009,192	623,204	1,385,988	....	....
Total (year)	2,622,363	868,229	1,754,134	2,592,129	862,328	1,729,801	....	....
1938								
January to September	1,437,767	[3]	[3]	1,439,183	[3]	[3]	....	....
October	209,889	[3]	[3]	208,821	[3]	[3]	7,390	195,494
Total (10 months)	1,647,656	[3]	[3]	1,648,004	[3]	[3]	....	....
Total (year)	1,965,577	[3]	[3]	1,964,951	[3]	[3]	....	....

[1] Steel barrels and drums (except beer barrels) of 19-gauge or *heavier* steel, and steel barrels and drums made wholly or partly of 20-gauge, when of other than open-head construction; also grease drums of 100 lbs. capacity when made of 20-gauge or *heavier* steel.

[2] Steel barrels and drums (except beer barrels) of steel *lighter* than 19-gauge, excepting steel barrels or drums made wholly or partly of 20-gauge, when of other than open-head construction; also grease drums of 100 lbs. capacity when made of steel *lighter* than 20-gauge.

[3] Data not available.

PROFESSIONAL DIRECTORY

Booklets & Catalogs

Chemicals

A252. Ammonia in Metal Treating; 48-page illustrated booklet. First part deals with case-hardening processes, including nitriding, dry cyaniding and hydrizing, in which ammonia gas is used directly as a furnace atmosphere. In second part toughening processes, including bright annealing and nitriding stainless steels, and types of equipment are discussed. The third section is devoted to welding processes and the fourth to the commercial applications of these processes. The fifth part gives technical information intended to familiarize the consumer with the chemical and physical properties of anhydrous ammonia and the general precautions to be observed in its safe handling and application. The Mathieson Alkali Works (Inc.).

A253. Bakelite Molding Plastics; 32-page colorfully illustrated booklet contains descriptions of compression and injection molding processes, explains differences between thermosetting (hot-set) and thermoplastic (cold-set) molding materials. Physical, mechanical, and electrical properties and characteristics of Bakelite phenolics, ureas, polystyrenes and acetates are given in editorial and table form. Bakelite Corp.

A254. Carbon Black Bulletin, Dec., 1940; discusses the effect of carbon black on the electrical conductivity of rubber. Godfrey L. Cabot, Inc.

A255. Chemicals From Coal; data sheets in booklet form presenting the physical and chemical properties of a number of organic chemicals that are now being produced on a commercial or semi-commercial scale from coal-tar. Koppers Co.

Dyestuffs, Dec., 1940; article on surface active agents in the degumming of silk hosiery, including several tables of data. Also an article on leather by Dr. Fred O'Flaherty. National Aniline & Chemical Co.

A256. Furfural as a Selective Solvent; 11-page article giving the history, manufacture, and properties of furfural and explaining its use as a selective solvent. The Quaker Oats Co.

A257. Glycerine Facts, Dec., 1940; review of the rôle of glycerine in artificial rubbers and the use of glycerine in a new flame testing method for metals. Also a number of short items on practical applications of glycerine. Glycerine Producers' Association.

A258. Synthetic Organic Chemicals; 12th edition of this book just published contains detailed properties and descriptions of the company's entire line of synthetic organic chemicals. The Sharples Solvents Corp.

A259. The Neoprene Notebook, 28; number of items on uses and applications of neoprene. E. I. du Pont de Nemours & Co., Inc.

A260. The Pioneer, Dec., 1940; article on treating textile wastes to prevent stream pollution. Also number of other short interesting items of general nature. Electro Bleaching Gas Co. and Niagara Alkali Co.

Equipment—Containers

E374. Adsco Flow Meter, Folder No. 140; 4-page folder illustrating and describing construction of meter. American District Steam Co.

E375. Apparatus for Checking Thermocouple Pyrometers, Catalog E-33A-503; 28-page catalog illustrates and describes complete line of equipment needed to check thermocouple pyrometers. Leeds and Northrup Co.

E376. Ball Bearings, Catalog No. 840; descriptions, illustrations and engineering data on ball bearings and ball bearing units. Stephens-Adamson Mfg. Co.

E377. Caustic Soda Tank Cars; folder describing improved tank car and resistant coating for the shipment of high concentration caustic soda without contamination. Columbia Chemical Division, Pittsburgh Plate Glass Co.

E378. Chemical Processing Equipment, Bulletin No. 353; describes and illustrates extensive line of mixers. The J. H. Day Co.

E379. Conveyor Belt; graphically illustrated, 12-page booklet giving construction details and varied types of operation of cord conveyor belts. The B. F. Goodrich Co.

E380. Double Cone Blender; 4-page bulletin describing machine for use in blending chemicals, plastics, pharmaceuticals, and similar products. H. K. Porter Co., Inc.

E381. Electrifugal Pumps, Bulletin B-6140; illustrates and describes new line of pumps from one to ten h.p. and for heads up to 160 feet. Allis-Chalmers Mfg. Co.

E382. Feedwater Facts, B-6133; picture presentation covering feed water problems common to the modern power plant. Deals with prevention of scale and elimination of carryover, caustic embrittlement and corrosion. Allis-Chalmers Mfg. Co.

E383. Friction Bearings, Book No. 1775; 88-page booklet of description, illustration and engineering data for those who use or buy bearings or other power transmission equipment. Link-Belt Co.

E384. Horizontal Duplex Side Pot Pumps, Bulletin W-103-B4A; illustrates, describes and gives specifications for this line of pumps for refinery service. Worthington Pump and Machinery Corp.

E385. Inco, Vol. 17, No. 3; 36-page illustrated booklet devoted to uses and applications of nickel and nickel alloys. The International Nickel Co., Inc.

E386. Liquefied Petroleum Gas Meters, Catalog LPG-4; illustrates and describes line of meters. Also gives specifications. American Meter Co.

E387. Motors, B-6107; 28-page illustrated booklet on "Motors for Driving Power House Auxiliaries." Allis-Chalmers Mfg. Co.

E388. Nickel Steel Topics, Dec., 1940; 12-page bulletin of short, interesting items of interest to producers and users of nickel alloy steels. The International Nickel Co., Inc.

Chemical Industries
522 5th Avenue
New York City

I would like to receive the following booklets

....

....

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All information requested above *must* be give[n] to receive attention.

Heavy Chemicals, Coal-Tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

PRICES CURRENT

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1939 Average $1.24 - Jan. 1940 $1.17 - Dec. 1940 $1.18

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Acetaldehyde, drs, c-l, wks lb.	...	.11	...	.11	.10	.14
Acetaldol, 95%, 55 gal drs wks ... lb.	.11	.12	.11	.25	.21	.25
Acetamide, tech, lcl, kgs lb.	.28	.30	.28	.50	.28	.50
Acetanilid, tech, 150 lb bbls lb.	.29	.31	.27	.31	.22	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd ... lb.	.10½	.11½	.10½	.11½	.10½	.11
Acetin, tech, drs ... lb.	...	.33	...	.33	...	.33
Acetone, tks, f.o.b. wks, frt all'd ... lb.	...	.06	.05	.06	.04¼	.06
drs, c-l, f.o.b. wks, frt all'd lb.	...	.07½	.06½	.07½	.05¾	.07¼
Acetyl chloride, 100 lb cbys lb	.55	.68	.55	.68	.55	.68

ACIDS

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Acetic, 28%, 400 lb bbls, c-l, wks ... 100 lbs.	...	2.23	...	2.23	...	2.23
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	...	7.62
glacial, USP bbls, c-l, wks ... 100 lbs.	...	10.25	...	10.25	...	10.25
Acetic Acid Glacial, *Synthetic* 99.5%, cbys, cases, delv lb.	...	.0918	...	...	...	...
99.5%, 110-gal dr, delv lb.	.0843	.0868	...	...	...	...
USP XI, cases, cbys, delv ... lb.	.1025	.11	...	...	...	...
USP XI, 110-gal drs, delv ... lb.	.10¼	.11	...	...	...	...
CP, cases, cbys, delv ... lb.	.13½	.14	...	...	...	..
CP, 55-gal drs, delv ... lb.	.13¼	.13½	...	...	...	...
Acetylsalicylic, USP, 225 lb. bbls ... lb.	...	.45	...	.45	.40	.50
Adipic, kgs, bbls ... lb.	...	.31	.31	.72	...	.72
Anthranilic, ref'd, bbls ... lb.	1.15	1.20	1.15	1.20	1.15	1.20
tech bbls ... lb.	.	.75	...	.75	...	.75
Ascorbic, bot ... oz.	2.00	2.05	2.25	3.00	2.75	3.25
Battery, cbys, wks ... 100 lbs.	1.60	2.55	1.60	2.55	1.60	2.55
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs ... lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ... ton *a*	93.50	96.00	...	96.00	...	96.00
Broenner's, bbls ... lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl ... lb.	...	.23	...	.23	...	.23
tks, wks ... lb.	...	.21	...	.21	...	.21
Caproic, normal, drs ... lb.	.30	.35	.35	.40	...	.35
Chicago, bbls ... lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs. wks ... lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.17¼
Citric, USP, crys, 230 lb bbls. ... lb. *b*	.20	.21	.20	.21½	.20	.22½
anhyd, gran bbls ... lb. *b*	...	.23	...	.23	.23	.25
Cleve's, 250 lb bbls ... lb.	...	.57	...	.57	...	.57
Cresylic, 99%, straw, HB, drs, wks, frt equal ... gal.	.68	.70	.68	.70	.49	.70
99%, straw, LB, drs, wks, frt equal ... gal.	.68	.70	.68	.75	.55	.75
resin grade, drs, wks, frt equal ... lb.	.08¾	.09¾	.08¾	.09¾	.08¼	.09¾
Crotonic, bbls, delv ... lb.	.21	.50	.21	.50	.21	.50
Formic, tech, 140 lb drs ... lb.	.10½	.11½	.10½	.11½	.10½	.11½
Fumaric, bbls ... lb.	.24	.28	.24	.75	...	.75
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls ... lb.	.90	.93	.75	.93	.70	.73
USP, bbls ... lb.	.92	.95	.92	.95	.77	.81
H, 225 lb bbls, wks ... lb.	...	.45		.45	.50	.55
Hydriodic, USP 47% ... lb.	...	2.42	2.30	2.42	...	2.30
Hydrobromic, 34% conct 155 lb cbys, wks ... lb.	.35	...	.35	.44	.42	.44
Hydrochloric, see muriatic						
Hydrofluoric, 30%, 400 lb bbls, wks ... lb.	.06	.06½	.06	.06½	.06	.07½
Hydrofluosilicic, 35%, 400 bbls, wks ... lb.	.09	.09½	.09	.09½	.09	.09½
Lactic, 22%, dark, 500 lb bbls ... lb.	.02½	.03¾	.02½	.03¾	.02½	.02¾
22%, light ref'd, bbls ... lb.	.03½	.04¾	.03½	.04¾	.03½	.03¾
44%, light, 500 lb bbls ... lb.	.06½	.07¼	.06½	.07¾	.05½	.05¾
44%, dark, 500 lb bbls ... lb.	.05½	.06¾	.05½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls ... lb.	.10½	.11½	.10½	.11½	.10½	.11½
Lauric, drs ... lb.	.12	.12½	.12	.14½	.11¾	.12¼
Laurent's, 250 lb bbls ... lb.	...	.45	.45	.46	.45	.46
Maleic, powd, kgs ... lb.	...	.30	.30	.40	.30	.40
Malic, powd, kgs ... lb.	...	.47	...	.47	.45	.60
Mixed, tks, wks ... N unit	.05	.06	.05	.07¼	.06½	.07¼
S unit	.0085	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.15	.18	.15	.18	.16	.18
Monosulfonic, bbls ... lb.	...	1.50	1.50	1.60	1.50	1.60

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls; *y* Price given is per gal.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Muriatic, 18°, 120 lb cbys, c-l, wks ... 100 lb.	...	1.50	..	1.50	...	1.50
tks, wks ... 100 lb.	...	1.05	1.00	1.05	...	1.00
20°, cbys, c-l, wks ... 100 lb.	...	1.75	...	1.75	...	1.75
tks, wks ... 100 lb.	...	1.15	1.10	1.15	...	1.10
22°, c-l, cbys, wks ... 100 lb.	...	2.25	...	2.25	...	2.25
tks, wks ... 100 lb.	...	1.65	1.60	1.65	...	1.60
CP, cbys ... lb.	.06½	.08	.06½	.08	.06½	.07¼
N & W, 250 lb bbls ... lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	nom.	nom.	.14	.10	.14
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks ... 100 lb. *c*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *c*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *c*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *c*	...	6.50	...	6.50	...	6.50
CP, cbys, delv ... lb.	.11½	.13	.11½	.13	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y ... lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	...	.12	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	...	.12	.06	.12	.06	.08
75%, acid, c-l, drs, wks lb.	...	.07½	...	.07½	...	.07½
Picric, kgs, wks ... lb.	...	.35	.35	.40	.35	.40
Propionic, 98% wks, drs ... lb.	...	.25	...	.25	...	.22
80% ... lb.	...	.14	.14	.20	.16	.17½
Pyrogallic, tech, lump, pwd, bbls ... lb.	...	1.20	1.05	1.20	1.45	1.63
cryst, USP ... lb.	1.70	2.25	1.55	2.25	1.55	2.10
Ricinoleic, bbls ... lb.	.27	.33	.27	.33	...	.35
Salicylic, tech, 125 lb bbls, wks ... lb.	...	.33	...	.33	...	.33
USP, bbls ... lb.	.35	.40	.35	.40	.35	.40
Succinic, bbls ... lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	...	.17	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ... ton	...	13.00	...	13.00	...	13.00
c-l, cbys, wks ... 100 lb.	...	1.25	...	1.25	...	1.25
66°, tks, wks ... ton	...	16.50	...	16.50	...	16.50
c-l, cbys, wks ... 100 lb.	...	1:50	...	1.50	...	1.50
CP, cbys, wks ... lb.	.06½	.08	.06½	.08	.06½	.07½
Fuming (Oleum) 20% tks, wks ... ton	..	18.50	...	18.50	..	18.50
Tannic, tech, 300 lb bbls ... lb.	.54	.56	.44	.56	.40	.47
Tartaric, USP, gran, powd, 300 lb bbls ... lb.	...	.46¼	.35¼	.46¼	.27½	.31¼
Tobias, 250 lb bbls ... lb.	.55	.60	.55	.60	.55	.67
Trichloroacetic bottles ... lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs ... lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls ... lb.	no prices		no prices		1.70	1.80
Albumen, light flake, 225 lb. bbls ... lb.	.55	.62	.55	.62	.52	.68
dark, bbls ... lb.	.13	.18	.13	.18	.13	.18
egg, edible ... lb.	.65	.68	.53	.65	.58	.78

ALCOHOLS

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Alcohol, Amyl (from Pentane) tks, delv ... lb.	...	.111	...	.111	...	.101
c-l, drs, delv ... lb.	...	.121	...	.121	...	.111
lcl, drs, delv ... lb.	...	.131	...	.131	...	.121
Amyl, normal l-c-l drs Wyandotte, Mich. ... lb.	...	.25	...	...	...	...
secondary, tks, delv ... lb.						
drs, c-l, delv E of Rockies ... lb.	...	.09½	...	09½	...	.09½
tertiary, rfd, l-c-l, drs, lb.	...	.09	...	...	...	...
Benzyl, cans ... lb.	...	.68	.68	1.00	.68	1.00
Butyl, normal, tks, f.o.b. wks, frt all'd ... lb. *d*	...	.09	...	.09	.07	.09
c-l, drs, f.o.b. wks, frt all'd ... lb. *d*	...	.10	...	.10	.08	.10
Butyl, secondary, tks, delv ... lb. *d*	...	.07¼	...	.07¼	.05½	.06½
c-l, drs, delv ... lb. *d*	...	.08¼	...	.08¼	.06½	.07½
Capryl, drs, tech, wks ... lb.	..	.85	...	.85	...	.85
Cinnamic, bottles ... lb.	2.00	2.50	2.00	2.50	2.00	2.50
Denatured, CD, 14, c-l drs, wks ... gal. *e*	.32½	.37½	.32½	.36½	.27½	.36½
tks, East, wks ... gal.	...	.26½	.25½	.26½	.21½	.25½
Western schedule, c-l, drs, wks ... gal. *e*	...	.37½	.34½	.37½	.34½	.37
Denatured, SD, No. 1, tks,	...	.24½	.23½	.24½	.25½	.28½
Diacetone, pure, c-lfi drs, delv ... lb. *f*	...	.09½	...	.12	.09	.12
tech, contract, drs, c-l, delv ... lb.	...	.09	...	.11½	.08½	.11½

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.


CHLORIDE OF LIME
(Bleaching Powder)
With a background of 80 years of service to chemical buyers, Turner offers uniform products of the highest standard at the lowest possible cost.
JOSEPH TURNER & CO.
RIDGEFIELD, NEW JERSEY
83 Exchange Place
Providence, R. I.
40th St. & Calumet Ave.
Chicago, Ill.
Chemicals for Industry

Prices Current

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Alcohols (continued):						
Ethyl, 190 proof, molasses, tks ....gal. g	...	5.94½	5.93½	5.94½	4.46	4.48½
c-l, drs ....gal. g	...	6.00½	5.92½	6.00½	4.49	4.54½
c-l, bbls ....gal. g	...	6.01½	6.00½	6.01½	4.53	4.55½
Furfuryl, tech, 500 lb drs lb.	...	.35	.25	.35	.25	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	...	.12
c-l, drs, delv ....lb.	...	.13	...	.13	...	.13
Normal, drs, wks ....lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv ....lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs ..lb.	...	.079	...	.079	.073	.09
c-l, drs ....lb.	...	.069	...	.069	.068	.08½
tks ....lb.	...	.069	...	.069	...	.07½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd ....lb.	...	.65	...	.65	...	.36
Ref'd 98%, drs, f.o.b. wks, frt all'd ....gal.	...	.65	...	.65	...	.41
Tech 91%, drs, above terms ....gal.	...	.33½	...	.33½	...	.33½
tks, same terms ....gal.	...	.28½	...	.28½	...	.28½
Tech 98%, drs, above terms ....gal.	...	.36	.36	.37½	...	.37½
tks, above terms ..gal.	...	.31	.31	.32½	...	.32½
Spec. Solvent, tks, wks gal.	...	.25½	.23½	.25½	.19	.23½
Aldehyde ammonia, 100 gal drs ....lb.	.65	.70	.65	.82	.80	.82
Aldehyde Bisulfite, bbls, delv ....lb.	...	.17	...	.17	...	.17
Aldol, 95%, 55 and 110 gal, drs, delv ....lb.	.11	.12	.11	.12	.11	.20
Alphanaphthol, crude, 300 lb. bbls ....lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls ....lb.	...	.32	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	3.40	3.75
delv NY, Phila ...100 lb.	...	3.75	...	3.75	3.40	3.75
Granular, c-l, bbls wks ....100 lb.	..	3.50	...	3.50	3.15	3.50
Powd, c-l, bbls, wks 100 lb.	...	3.90	...	3.90	3.55	3.90
Chrome, bbls ....100 lb.	no prices		6.50	6.75	6.50	6.75
Potash, lump, c-l, bbls, wks ....100 lb.	...	4.00	...	4.00	3.65	4.00
Granular, c-l, bbls, wks ....100 lb.	...	3.75	...	3.75	3.40	3.75
Powd, c-l, bbls, wks 100 lb.	...	4.15	...	4.15	3.80	4.15
Soda, bbls, wks ....100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	18.00	18.00	20.00	...	20.00
Acetate, 20%, bbls ....lb.	.08	.09	.07½	.09	.07½	.09
Basic powd, bbls, delv lb.	.35	.50	.35	.50	.40	.50
32% basic, bbls, delv lb.	.09½	.12	...	...	...	...
Insoluble basic powder, bbls, delv ....lb.	...	.40	...	...	...	...
Soluble normal pwdr lb.	...	.22	...	...	...	...
Soluble basic powder lb.	...	.33	...	...	...	...
Chloride anhyd 99% wks lb.	.08	.12	.08	.12	.06	.12
93%, wks ....lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06½	.06	.06½	.06	.06¼
Solution, drs, wks ...lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv ....lb.	...	.13	...	.13	...	.13
Hydrate, 96%, light, 90 lb. bbls, delv ....lb.	.12½	.13	.12½	.13½	.11½	.13
heavy, bbls, wks ....lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs ....lb.	.17½	.20	.16¾	.20	.16¾	.18½
Palmitate, bbls ....lb.	.20½	.21½	.20½	.24½	.23	.24½
Resinate, pp., bbls ....lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls ...lb.	.18	.19	.19	.20	.16	.22½
Sulfate, com, c-l, bgs, wks ....100 lb.	...	1.15	...	1.15	...	1.15
c-l, bbls, wks ....100 lb.	...	1.35	...	1.35	...	1.35
Sulfate, iron-free, c-l, bags, wks ....100 lb.	...	1.60	1.60	1.80	...	1.45
c-l, bbls, wks ....100 lb.	...	1.80	1.65	1.80	...	1.65
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	...	.05	.04½	.05	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	...	.16	...	.16	...	.16
50 lb cyl ....lb.	...	.22	...	.22	...	.22
26°, 800 lb drs, delv ...lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH ..cont.	...	.05¼z	.04	.05¼	...	.04z
Ammonium Acetate, kgs ..lb.	.27	.33	.27	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks ....100 lb.	...	.0564	...	.0564	5.15	5.71
Bifluoride, 300 lb bbls ..lb.	.14½	.16½	.14½	.16½	.14½	.16½
Carbonate, tech, 500 lb bbls ....lb.	.08¼	.09¼	.08¼	.11	.08	.12
Chloride, White, 100 lb bbls, wks ....100 lb.	4.45	...	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks ....100 lb.	5.50	5.75	5.50	6.25	5.50	6.25
Lump, 500 lb cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls ....lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls ....lb.	...	.23	...	.23	...	.23
Linoleate, 80% anhyd, bbls ....lb.	...	.12	...	.12	.11	.15
Naphthenate, bbls ....lb.	...	.17	...	.17	...	.17
Nitrate, tech, bbls ....lb.	...	.0455	...	.0455	.036	.0455
Oleate, drs ....lb.	...	.14	...	.14	.11	.14
Oxalate, neut, cryst, powd, bbls ....lb.	.19	.25	.19	.25	.19	.20
Perchlorate, kgs ....lb.	.17	nom.	.17	.19	...	.16
Persulfate, 112 lb kgs ..lb.	.21	.22	.21	.22	.21	.24
Phosphate, diabasic tech, powd, 325 lb bbls ....lb.	.07¼	.09¼	.07¼	.10	.07½	.10
Ricinoleate, bbls ....lb.	...	.15	...	.15	...	.15
Stearate, anhyd, bbls ...lb.	...	.24½	...	.24½	.22	.24½
Paste, bbls ....lb.	...	.06½	...	.06½	.06½	.08

g Grain alcohol 25c a gal. higher in each case. ** On a delv. basis.
z On a f.o.b. wks. basis.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Ammonium (continued):						
Sulfate, dom, f.o.b., bulk ton	...	29.00	...	29.00	27.00	28.00
Sulfocyanide, pure, kgs ..lb.	...	.65	...	.65	.55	.65
Amyl Acetate (from pentane) tks, delv ....lb.	...	.105	...	.105	.095	.10
c-l, drs, delv ....lb.	...	.115	...	.115	.105	.11
lcl, drs, delv ....lb.	...	.125	...	.125	.115	.112
tech drs, delv ....lb.	...	.12	...	.12	.10½	.12½
Secondary, tks, delv ..lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv ....lb.	...	.09½	...	.09½	...	.09½
tks, delv ....lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks ....lb.	.0565	.0665	.0535	.0665	.0565	.077
tks, wks ....lb.	...	.0465	...	.0465	.0465	.06
Mercaptan, drs, wks ...lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs ....lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs ..lb.	...	.26	...	.26	...	.26
Amylene, drs, wks ....lb.	.102	.11	.102	.11	.102	.11
tks, wks ....lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks ....lb.	...	.14½	...	.14½	.14½	.17½
Annatto fine ....lb.	.34	.39	.34	.39	.34	.39
Anthracene, 80% ....lb.	...	.55	...	.55	.55	.75
Anthraquinone, sublimed, 125 lb bbls ....lb.	...	.65	...	.65	...	.65
Antimony metal slabs, ton lots ....lb.	...	.14	...	.14	.11¼	.14
Butter of, see Chloride						
Chloride, soln, cbys ....lb.	...	.17	...	.17	...	.17
Needle, powd, bbls ....lb.	...	.16	.16	.22	.12	.20
Oxide, 500 lb bbls ....lb.	.13½	.14½	.13	.15¾	.10	.15¾
Salt, 63% to 65%, tins lb.	...	.28	.28	nom.	.25¾	.42
Archil, conc, 600 lb bbls lb.	no prices		no prices		.21	.27
Double, 600 lb bbls ....lb.	no prices		no prices		.18	.20
Aroclors, wks ....lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbls ....lb.	.09½	.10	.09	.10	.08½	.09
Arsenic, Metal ....lb.	no prices		....	...	.40	.60
Red, 224 lb cs kgs ....lb.	no prices		.17½	.18	.18	.19
White, 112 lb kgs ....lb.	.03½	.04¼	.03	.04¼	.03	.03¾

B

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Barium Carbonate precip, 200 lb bgs, wks ....ton	45.00	50.00	45.00	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ....ton	...	43.00	43.00	47.00	41.00	47.00
Chlorate, 112 lb kgs, NY lb.	...	.45	.20	.45	.16½	.25
Chloride, 600 lb bbls, delv, zone 1 ....ton	77.00	92.00	77.00	92.00	77.00	92.00
Dioxide, 88%, 690 lb drs lb.	.	.10	.10	.12	.11	.12
Hydrate, 500 lb bbls ...lb.	.05½	.07	.05½	.07	.04½	.05½
Nitrate, bbls ....lb.	.08½	.10½	.09½	.10½	.06¾	.10½
Barytes, floated, 350 lb bbls c-l, wks ....ton	...	25.15	.	25.15	...	23.65
Bauxite, bulk, mines ....ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ....ton	...	16.00	...	16.00	...	16.00
200 mesh ....ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb. drs, wks ....lb.	.45	.50	.55	.60	.60	.62
Benzene (Benzol), 90%, Ind. 8000 gal tks, ft all'd gal.	...	.14	.14	.16	...	.16
90% c-l, drs ....gal.	...	.19	.19	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.14	.14	.16	...	.16
Benzidine Base, dry, 250 lb. bbls ....lb.	...	.70	...	.70	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.23	.28	.23	.28	.40	.45
Benzyl Chloride, 95-97% rfd, drs ....lb.	.19	.21	.19	.21	.30	.40
Beta-Naphthol, 250 lb bbls, wks ....lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls ....lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls ....lb.	.51	.52	.51	.52	.51	.52
Bismuth metal ....lb.	...	1.25	...	1.25	1.05	1.25
Chloride, boxes ....lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes ....lb.	3.35	3.46	3.35	3.46	3.15	3.40
Oxychloride, boxes ....lb.	...	3.10	...	3.10	2.95	3.10
Subbenzoate, boxes ....lb.	...	3.36	3.25	3.36	3.25	3.30
Subcarbonate, kgs ....lb.	1.73	1.76	1.73	1.76	1.43	1.76
Subnitrate, fibre, drs ...lb.	1.48	1.51	1.48	1.51	1.23	1.51
Trioxide, powd, boxes ..lb.	...	3.56	3.56	3.57	...	3.57
Blanc Fixe, 400 lb bbls, wks ton h	35.00	42.50	50.00	80.00	40.00	80.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	2.00	2.85	...	2.85	...	2.00
lcl, drs, wks ....lb.	2.25	3.35	2.25	3.35	2.25	3.60
Blood, dried, f.o.b., NY unit	...	2.40	2.25	3.35	2.50	4.25
Chicago, high grade ..unit	...	2.50	2.00	3.50	2.30	4.25
Imported shipt ....unit	...	2.45	2.25	3.30	2.65	3.90
Blues, Bronze Chinese						
Prussian Soluble ....lb.	...	.33	.33	.37	.33	.37
Milori, bbls ....lb.	.33	.34	.33	.34	.33	.37
Ultramarine,* dry, wks, bbls ....lb.	...	.11	...	.11	...	.11
Regular grade, group 1 lb.	...	.16	...	.16	...	.16
Special group 1 ....lb.	...	.19	...	.19	...	.19
Pulp, No. 1 ....lb.	.22	.24	.22	.27	...	.27
Bone, 4½ + 50% raw, Chicago ....ton	30.00	33.00	30.00	33.00	27.00	35.00
Bone Ash, 100 lb kgs ....lb.	.06	.07	.06	.07	.06	.07
Meal, 3% & 50%, imp ton	...	31.50	31.50	32.50	22.00	32.00
Domestic, bgs, Chicago ton	...	32.00	29.00	32.00	24.00	32.00
Borax, tech, gran, 80 ton lots, sacks, delv ....ton i	...	43.00	...	43.00	...	43.00
bbls, delv ....ton i	...	53.00	...	53.00	...	53.00

h Lowest price is for pulp, highest for high grade precipitated; i Crystals $6 per ton higher; USP, $15 higher in each case; *Freight is equalized in each case with nearest producing point.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Borax (continued)						
Tech, powd, 80 ton lots, sacks ....ton j	...	48.00	47.00	48.00	...	47.00
bbls, delv ....ton j	...	58.00	57.00	58.00	...	57.00
Bordeaux Mixture, drs ...lb.	11	.11½	.11	.11½	.11	.11½
Bromine, cases ....lb.	.25	.30	.25	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	...	.57	...	.57	.90½	.92½
Gold, blk ....lb.	.60	.65	.60	.65	.45	.65
Butanes, com 16-32° group 3 tks ....lb.	.02½	.03	.02¼	.03¾	.02¼	.03¾
Butyl, acetate, norm drs, frt all'd ....lb.	...	.10	...	.10	.09	.10
tks, frt all'd ....lb	...	.09	...	.09	.08	.09
Secondary, tks, frt all'd lb.	...	.07¼	...	.07¼	.05½	.06½
drs, frt all'd ....lb.	.07½	.08	.07½	.08	.068	.08
Aldehyde, 50 gal drs, wks ....lb.	.15½	.17½	.15½	.17½	.15½	.17½
Carbinol, norm (see Normal Amyl Alcohol)						
Crotonate, norm, 55 and 110 gal drs, delv ....lb.	...	.35	...	.35	.35	.75
Lactate ....lb.	...	.23½	.23½	.24½	.22½	.24½
Oleate, drs, frt all'd ...lb.	...	.25	...	.25	...	.25
Propionate, drs ....lb.	.16½	.17	.16½	.17	.16½	.18½
tks, delv ....lb.	.	.15½	...	.15½	.15½	.17
Stearate, 50 gal drs ....lb.	.	.28½	...	.28½	.26½	.28½
Tartrate, drs ....lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	.	.35½	...	.35½	...	.35½
C						
Cadmium Metal ....lb.	.80	.85	.80	.85	.50	.85
Sulfide, orange, boxes ..lb.	...	.75	.75	.85	.75	.90
Calcium, Acetate, 150 lb bgs c-l, delv ....100 lb.	...	1.90	...	1.90	1.65	1.90
Arsenate, c-l, E of Rockies, dealers, drs ....lb.	.06	.06½	.06	.07¼	.06¾	.07¼
Carbide, drs ....lb.	..	.04¾	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs, c-l ....ton	16.00	20.00	...	...	...	...
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv ..ton	.	20.50	...	22.00	...	22.00
paper bags, c-l, delv ton	20.50	35.00	20.50	36.00	23.00	36.00
Solid, 650 lb drs, c-l, delv ....ton	19.00	33.00	19.00	35.00	...	20.00
Ferrocyanide, 350 lb bbls wks ....lb.	...	.20	...	.20	...	.20
Gluconate, Pharm, 125 lb bbls ....lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks ....lb.	.	3.00	...	3.00	...	3.00
Nitrate, 100 lb bags ...ton	no prices		28.00	29.00	...	28.00
Palmitate, bbls ....lb.	.22	.24	.22	.24	.22	.23
Phosphate, tribasic, tech, 450 lb bbls ....lb.	.0635	.0705	.0635	.07½	.06½	.07½
Resinate, precip, bbls ..lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ...lb.	.20½	.22½	.20½	.22½	.19	.21
Camphor, slabs ....lb.	.82	.83	.82	.84	.46	.77
Powder ....lb.	.82	.83	.82	.84	.45	.47
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¼
Black, c-l, bgs, delv. price varying with zone† ..lb.	...	.02¾	.02¾	.03¾	.02¾	.03¾
lcl, bgs, f.o.b. whse ..lb.	...	.06525	...	.06525	...	.06¼
cartons, f.o.b. whse ....lb.	...	.06525	...	.06525	...	.06¼
cases, f.o.b. whse ....lb.	...	.07025	...	.07025	...	.07
Decolorizing, drs, c-l ..lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv ....lb.	...	.66½	...	.66½	.05	.05½
Casein, Standard, Dom, grd lb.	.13	.14	.10	.14½	.07	.23
80-100 mesh, c-l bgs ...lb.	.13½	.14½	.11	.15	.07½	.23½
Castor Pomace, 5½ NH_3, c-l, bgs, wks ....ton	15.00	...	15.00	17.50	16.50	18.50
Imported, ship, bgs ....ton	no prices		...	20.00	18.00	18.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs ....lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs ....lb.	...	.30	.30	.34	.35	.36
Chalk, dropped, 175 lb bbls lb.	...	.02¾	.02¾	.03¾	.02¾	.03¾
Precip, heavy, 560 lb cks lb.	...	.03¼	.02¾	.03¼	.02¾	.03¼
Light, 250 lb cks ....lb.	...	.03¼	.03¼	.04	.03¼	.04
Charcoal, Hardwood, lump, blk, wks ....bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ..ton	25.00	36.00	25.00	36.00	23.00	36.00
Willow, powd, 100 lb bbls, wks ....lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified tks, wks lb.	...	.01¾	...	.01¾	...	.01¾
25%, bbls, wks ....lb.	...	.02⅜	...	.02½	...	.02
China Clay, c-l, blk mines ton	...	7.60	7.60	9.50	7.00	7.60
Imported, lump, blk ...ton	no prices		...	26.00	22.00	26.00
Chlorine, cyls, lcl, wks, contract ....lb.	...	.07¼	.07½	.08½	.07½	.08½
cyls, c-l, contract ...lb j	...	.05¼	...	.05¼	.05¼	.05½
Liq. tk, wks, contract 100 lb.	...	1.75	...	1.75	1.75	2.00
Multi, c-l, cyls, wks, cont ....lb.	...	.019	...	.019	1.90	2.15
Chloroacetophenone, tins, wks ....lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb. drs, lcl, wks ....lb.	.06	.08	.06	.08	.06	.07½
Chloroform, tech, 1000 lb drs ....lb.	...	.20	.20	.21	.20	.21
USP, 25 lb tins ....lb.	...	.30	.30	.31	.30	.31
Chloropicrin, comml cyls ..lb.		.80	...	.80	...	.80
Chrome, Green, CP ....lb.	.21	.25	.21	.25	.21	.25
Yellow ....lb.	.13½	.14½	.13½	.14½	.13½	.15½
Chromium Acetate, 8% Chrome, bbls ....lb.	...	.05¾	...	.05¾	.05	.08
Fluoride, powd, 400 lb bbl ....lb.	.27	.28	.27	.28	.27	.28

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Coal tar, bbls ....bbl.	7.50	7.75	7.50	8.00	7.50	8.00
Cobalt Acetate, bbls ....lb.	...	.80½	...	.80½	.65	.71
Carbonate tech, bbls ...lb.	...	1.58	1.38	1.60	1.25	1.63
Hydrate, bbls ....lb.	...	1.98	...	1.78	...	1.78
Linoleate, solid, bbls ...lb.	...	.33	...	.33	...	.33
paste, 6%, drs ....lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ....lb.	...	1.84	...	1.84	1.67	1.84
Resinate, fused, bbls ...lb.	...	.13½	...	.13½	...	.13½
Precipitated, bbls ....lb.	...	.34	...	.34	...	.34
Cochineal, gray or bk bgs lb.	.37	.38	.37	.38	.35	.38
Teneriffe silver, bgs ....lb.	.38	.39	.38	.39	.36	.39
Copper, metal, electrol 100 lb.	...	12.00	11.00	12.00	.10	12.50
Acetate, normal, bbls, wks ....lb.	.22	.24	.22	.24	.21	.24
Carbonate, 52-54% 400 lb bbls ....lb.	...	.1650	.1570	.169	.14½	.169
Chloride, 250 lb bbls ...lb.	...	.16	.16	.18	.12½	.18
Cyanide, 100 lb drs ....lb.	...	.34	...	.34	...	.34
Oleate, precip, bbls ....lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks lb.	...	.18	.18	.18¾	.15	.18¾
red 100 lb bbls ....lb.	...	.20½	.19½	.20½	.15¾	.20
Sub-acetate verdigris, 400 lb bbls ....lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks, 100 lb.	...	4.75	4.45	4.75	4.10	4.75
Copperas crys and sugar bulk c-l, wks ....ton	18.00	20.00	14.00	20.00	14.00	16.00
Corn Sugar, tanners, bbls 100 lb.	...	3.36	2.99	3.39	2.89	3.19
Corn Syrup, 42°, bbls 100 lb.	...	3.47	3.02	3.47	2.92	3.17
43°, bbls ....100 lb.	...	3.52	3.07	3.52	2.97	3.22
Cotton, Soluble, wet 100 lb. bbls ....lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran 300 lb bbls ....lb.	...	.38¼	.28¼	.38¼	.24¼	.25¾
Creosote, USP 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1 tks ....gal.	.13½	14	.13½	.14	.13½	.14
Grade 2 ....gal.	.122	.132	.122	.132	.122	.132
Cresol, USP, drs ....lb.	.09¾	.10¼	.09¾	.10¼	.09½	.10½
Crotonaldehyde, 97%, 55 and 110 gal drs, wks ....lb.	.11	.12	.11	.12	.11	.22*
Cutch, Philippine, 100 lb. bale lb.	...	.04½	.04	.04½	.04	.04½
Cyanamid, pulv, bags, c-l, frt all'd, nitrogen basis, unit	...	1.40	...	1.40	...	1.27½
D						
Derris root 5% rotenone, bbls ....lb.	.21	.23	.21	.30	.24	.30
Dextrin, corn, 140 lb bgs f.o.b., Chicago ...100 lb.	...	3.80	3.40	3.80	3.30	3.75
British Gum, bgs 100 lb.	...	4.10	3.65	4.10	3.55	3.95
Potato, Yellow, 220 lb bgs lb.		.07¾		.07¾	.07	.08¾
White, 220 lb bgs, lcl lb.	.08½	.09	.08½	.09	.08	.09
Tapioca, 200 bgs, lcl lb.	...	.0715	...	.0715	...	.0715
White, 140 lb. bgs ..100 lb.	...	3.75	3.35	3.75	3.25	3.70
Diamylamine, c-l, drs, wks lb.	...	.47	...	.47	...	.47
lcl drs, wks ....lb.	...	.48	...	.50	...	.50
tks, wks ....lb.	.	.45	.	.45		.45
Diamylene, drs, wks ....lb.	.095	.102	.095	.102	.095	.102
tks, wks ....lb.		.08½	.	.08½		.08½
Diamylether, wks, drs ....lb.	.085	.092	.085	.092	.085	.092
tks, wks ....lb.	...	.075	...	.075		.075
Oxalate, lcl, drs, wks ..lb.	...	.30	...	.30		.30
Diamylphthalate, drs, wks lb.	.21	.21½	.21	.21½	.19	.21
Diamyl Sulfide, drs, wks lb.	.	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate, drs, wks ....lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	.51	.53	.51	.53	.53	.55
c-l drs, wks ....lb.	...	.50	...	.50	...	
tks, wks ....lb.	...	.48	...	.48	...	
Dibutyl Ether, drs, wks, lcl lb.	.24½	.25	.24½	.25	.24½	.25
Dibutylphthalate, drs, wks, frt all'd ....lb.	.19	.19½	.19	.19½	.19	.19½
Dibutyltartrate, 50 gal drs lb.	...	.50	...	.50	.45	.54
Dichlorethylene, drs ....lb.	...	.25	...	.25	...	.25
Dichloroethylether, 50 gal drs, wks ....lb.	.15	.16	.15	.16	.15	.16
tks, wks ....lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	...	.025	...	.025	no prices	
tks, wks ....lb.	...	.0221	...	.0221	no prices	
Diethanolamine, tks, wks ..lb.	...	.22½	...	.22½	.22½	.23
Diethylamine, 400 lb drs, lcl, f.o.b., wks ....lb.	...	.70	...	.70	.70	3.00
Diethylaniline, 850 lb drs lb.	...	.40	.40	.52	.40	.52
Diethyl Carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs lb.	...	.25	...	.25	.31¾	.35
Diethylorthotoluidin, drs lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.19	.19½
Diethylsulfate, tech, drs, wks, lcl ....lb.	.13	.14	.13	.14	.13	.14
Diethyleneglycol, drs ....lb.	.14½	.15½	.14½	.15½	.14½	.17
Mono ethyl ethers, drs ..lb.	.14½	.15½	.14½	.16	.15	.16
tks, wks ....lb.	...	.13½	...	.13½	.13½	.14
Mono butyl ether, drs ..lb.	.22½	.24½	.22½	.24½	.23	.24
tks, wks ....lb.	...	.22	...	.22	...	.22
Diethylene oxide, 50 gal drs, wks ....lb.	.20	.24	.20	.24	.20	.24
Diglycol Laurate, bbls ...lb.	...	.16	.16	.21	.15	.23
Oleate, bbls ....lb.	...	.17	.13	.17	.13	.20
Stearate, bbls ....lb.	...	.22	.22	.26	.20	.28
Dimethylamine, 400 lb drs, pure 25 & 40% sol 100% basis ....lb.	1.00	1.05	1.00	1.05	...	1.00
Dimethylaniline, 240 lb drs lb.	.23	.24	.23	.24	.23	.24
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks, frt all'd ....lb.	...	.18½	...	.18½	.	.19
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50

k Higher price is for purified material; * These prices were on a delivered basis.

Since 1905

PHOSPHORUS (Yellow) Produced in our own electric furnace using phosphate rock from our own mines.

PHOSPHORIC ACID 75% Pure Food Grade. Made from high quality elemental phosphorus.

ELECTROPHOS* A superior quality of triple superphosphate of approximately 48% available P_2O_5. Almost white in appearance.

FLORIDA PEBBLE PHOSPHATE ROCK
Grades 77% B. P. L. and all standards to 68%. Also of special specifications—quality—calcining—grinding.

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THE PHOSPHATE MINING CO.

110 WILLIAM STREET, NEW YORK

Church & Dwight Co., Inc.

Established 1846

70 PINE STREET NEW YORK

Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

Standard Quality

	Current	Market	1940 Low	1940 High	1939 Low	1939 High
Dinitrobenzene, 400 lb bbls lb. *k*	...	.18	.18	.19	.16	.19
Dinitrochlorobenzene, 400 lb bbls .... lb.	...	.14	...	.14	.13½	.14
Dinitronaphthalene, 350 lb bbls .... lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls lb.	...	.22	.22	.23	.22	.24
Dinitrotoluene, 300 lb bbls lb.	...	.15½	...	.15½	...	.15½
Diphenyl, bbls .... lb.	.15	.20	.15	.20	.15	.25
Diphenylamine .... lb.	...	.25	.25	.32	.32	.32
Diphenylguanidine, 100 lb drs .... lb.	.35	.37	.35	.37	.31	.37
Dip Oil, see Tar Acid Oil.						
Divi Divi pods, bgs shipmt ton		nom.	...	nom.	...	nom.
Extract .... lb.	.05¾	.06¾	.05¾	.06¾	.05¾	.06¾
Drymet (see sodium metasilicate anhydrous).						
E						
Egg Yolk, dom., 200 lb. cases lb.	.60	.62	.57	.62	.59	.69
Epsom Salt, tech, 300 lb bbls c-l, NY ..... 100 lb.	...	1.90	1.90	2.10	1.90	2.10
USP, c-l, bbls ..... 100 lb.	...	2.10	...	2.10	...	2.10
Ether, USP anaesthesia 55 lb drs .... lb.	...	.26	...	.26	.22	.23
Isopropyl 50 gal drs ... lb.	.07	.08	.07	.08	.07	.08
tks, frt all'd .... lb.	...	.06	...	.06	...	.06
Nitrous conc bottles ... lb.	...	.68	...	.68	...	.68
Synthetic, wks, drs .... lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester tks, frt all'd .... lb.	...	.06½	.06	.06½	.051	.061
drs, frt all'd .... lb.	...	.07½	.07	.08½	.061	.08
99%, tks, frt all'd ... lb.	...	.06¾	.06¼	.08	.0585	.0685
drs, frt all'd .... lb.	...	.07¾	.07¼	.08¾	.0685	.0785
Acetoacetate, 110 gal drs lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs lb.	.86	.88	.86	.88	.86	.88
Bromide, tech drs ..... lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd .... lb.	.45	.50	.45	.50	.45	.50
Chloride, 200 lb drs .... lb.	.18	.20	.18	.20	.22	.24
Chlorocarbonate, cbys .. lb.	...	.30	...	.30	...	.30
Crotonate, drs .... lb.	...	35	...	.35	.35	.75
Formate, drs, frt all'd .. lb.	.25	.26	.23	.24	.27	.28
Lactate, drs, wks ...... lb.	...	.33½	...	.33½	...	.33½
Oxalate, drs, wks ...... lb.	...	.25	...	.25	.30	.34
Oxybutyrate, 50 gal drs, wks .... lb.	1.00	nom.	.30	1.00	.30	.30½
Silicate, drs, wks ...... lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs .... lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont .... lb.	.75	.85	.75	.85	.75	.85
Anhydrous .... lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks lb.	.0595	.0694	.0595	.0694	.0545	.0994
Glycol, 50 gal drs, wks .. lb.	.14½	.18½	.14½	.18½	.14½	.21
tks, wks .... lb.	...	.13½	...	.13½	.13½	.16
Mono Butyl Ether, drs, wks .... lb.	.16½	.17½	.16½	.21	.16½	.22
tks, wks .... lb.	...	.15½	...	.15½	.15½	.19
Mono Ethyl Ether, drs wks .... lb.	.14½	.15½	.14½	.15½	.14½	.17
tks, wks .... lb.	...	.13½	...	.13½	.13½	.15
Mono Ethyl Ether Acetate, drs, wks ..... lb.	.11½	.12½	.11½	.13	.11½	.14
tks, wks .... lb.	...	.10½	...	.10½	.10½	.13
Mono Methyl Ether, drs wks .... lb.	.15½	.16½	.15½	.17	.16	.22
tks, wks .... lb.	...	.14½	...	.14½	.14½	.17
Oxide, cyl .... lb.	.50	.55	.50	.55	.50	.55
Ethylideneaniline .... lb.	45	.47½	.45	.47½	.45	.47½
F						
Feldspar, blk pottery .... ton	17.00	19.00	17.00	19.00	17.00	19.00
Powd, blk wks .... ton	14.00	17.50	14.00	17.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls .... lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys .... lb.	.06½	.07	.06¼	.07	.06¼	.06½
Fish Scrap, dried, unground wks .... unit *l*	...	3.25	3.10	4.25	3.00	4.25
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis .... unit *m*	...	2.50	2.25	3.50	2.35	3.00
Fluorspar, 98% bgs .... ton	...	29.00	29.00	32.00	30.00	33.00
Formaldehyde, USP, 400 lb bbls, wks .... lb.	.055	.06	.05¾	.06¼	.05¾	.06¼
Fossil Flour .... lb.	.02½	.04	.02½	.04	.02½	.04
Fullers Earth, blk, mines ton	...	15.00	...	15.00	10.00	11.00
Imp powd, c-l, bgs .... ton	no prices		...	25.00	23.00	30.00
Furfural (tech) drs, wks lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs .... lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities lb.	.16	.17¼	.16	.17¼	.12½	.17¼
Fustic, crystals, 100 lb boxes .... lb.	.24	.25	.24	.28	.22	.28
Liquid 50°, 600 lb bbls lb.	10½	.14	.10½	.14	.09½	.14
Solid, 50 lb boxes ..... lb.	.19	.21	.19	.21	.17½	.21
G						
G Salt paste, 360 lb bbls .. lb.	...	.45	.45	.47	.45	.47
Gambier, com 200 lb bgs .. lb.	.06½	.07	.06½	.07	.06¾	.07¾
Singapore cubes, 150 lb bgs .... 100 lb.	.08¼	.08¾	.08¼	.10	.08	.10
Gelatine, tech, 100 lb cs .. lb.	.42	.43	.42	.43	.42	.50
Glauber's Salt, tech, c-l, bgs, wks* .... 100 lb.	.95	1.18	.95	1.18	.95	1.18
Anhydrous, see Sodium Sulfate						

l + 10; *m* + 50; * Bbls. are 20c higher.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Glue, bone, com grades, c-l bgs ....lb.	.13½	.15	.13½	.15½	.13½	.15½
Better grades, c-l, bgs lb.	.15	.23	.15	.23	.11½	.15½
Glycerin, CP, 550 lb drs lb.	...	.12½	...	.12½	...	.12½
Dynamite, 100 lb drs ...lb.		nom.		nom.	...	.09
Saponification, drs .....lb.	.09½	.10½	.09½	.13	.08½	.10
Soap Lye, drs ....lb.	.07⅛	.07⅜	.07⅛	.08¼	.07½	.07⅞
Glyceryl Bori-Borate, bbls lb.	...	.40	...	.40	...	.40
Monoricinoleate, bbls ...lb.	...	.27	...	.27	...	.27
Monostearate, bbls .....lb.	...	.30	...	.30	...	.30
Oleate, bbls ....lb.	...	.22	...	.22	...	.22
Phthalate ....lb.	...	.38	.37	.38	...	.37
Glyceryl Stearate, bbls ...lb.	...	.18	...	.18	.24	.27½
Glycol Bori-Borate, bbls ..lb.	...	.22	...	.22	.22	.23
Phthalate, drs ....lb.	...	.38	...	.38	.38	.40
Stearate, drs ....lb.	...	.26	...	.26	...	.26

GUMS

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Gum Aloes, Barbadoes ...lb.	.80	.85	.80	.90	.85	.90
Arabic, amber sorts ....lb.	.14	.15	.08½	.15	.09	.24
White sorts, No. 1, bgs lb.	.35	.36	.28	.36	.23	.35
No. 2, bgs ....lb.	no prices		.27	.34	.21	.34
Powd, bbls ....lb.	.18	.20	.12½	.20	.12½	.27
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b. NY ....lb.	.04½	.05½	.02½	.10½	.02½	.10½
California, f.o.b. NY, drs ton	29.00	36.50	29.00	36.50	29.00	55.00
Egyptian, 200 lb cases, f.o.b. NY ....lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases ....lb.	.19	.20	.17	.24	.17	.34
Copal, Congo, 112 lb bgs, clean, opaque ....lb.	...	.49½	...	.49½	.18¼	.29½
Dark amber ....lb.	...	.12⅜	.11⅜	.12⅜	.07⅛	.11⅜
Light amber ....lb.	...	.17	...	.17	.11¼	.17
Copal, East India, 180 lb bgs						
Macassar pale bold ....lb.	...	.12¾	.12¾	.15⅝	.11⅜	.15¼
Chips ....lb.	...	.06¾	.06¾	.09	.05⅜	.08½
Dust ....lb.	...	.05¼	.04¾	.06¾	.03¼	.07⅛
Nubs ....lb.	...	.10½	.10½	.14⅜	.09½	.13¾
Singapore, Bold ....lb.	...	.15¾	.14⅝	.17½	.14	.18¼
Chips ....lb.	...	.08½	.08½	.09⅛	.05⅝	.10¼
Dust ....lb.	...	.05¼	.04¾	.06¾	.03¼	.07⅛
Nubs ....lb.	...	.11	.11	.13½	.09⅝	.14⅜
Copal Manila, 180-190 lb	...	.13⅞	.13¾	.16¾	.09¾	.14½
Loba B ....lb.	...	.11¾	.11¾	.16⅛	.09	.14⅛
Loba C ....lb.	...	.11¼	.11¼	.14½	.07⅞	.12½
DBB ....lb.	...	.10	.06⅞	.12⅛	.05⅛	.08½
MA sorts ....lb.	...	.07¾	.07¾	.13¾	.05⅞	.11
Copal Pontianak, 224 lb cases, bold genuine ..lb.	...	.15⅜	.15⅛	.18½	.15¼	.18½
Chips ....lb.	...	.10	.08⅜	.10½	.07⅛	.11½
Mixed ....lb.	...	.14⅜	.14⅛	.16⅝	.13⅜	.16⅝
Nubs ....lb.	...	.12¾	.10⅜	.13½	.10½	.14⅜
Split ....lb.	...	.13¾	.13½	.16⅛	.12	.16⅛
Damar Batavia, 136 lb cases						
A ....lb.	...	.21⅝	.21⅝	.22¾	.20	.23¾
B ....lb.	...	.20¼	.20⅛	.21⅛	.18½	.21⅛
C ....lb.	...	.14⅝	.15⅝	.15¼	.13½	.15⅝
D ....lb.	...	.13¼	.13¼	.13¾	.12¼	.14¼
A/D ....lb.	...	.15¼	.13⅞	.14½	.12¾	.15¼
A/E ....lb.	...	.12⅞	.12⅞	.13⅜	.11⅜	.13¾
E ....lb.	...	.10	.10	.10⅜	.07⅜	.10
F ....lb.	...	.08	.08	.08¾	.07¼	.08¾
Singapore, No. 1 ......lb.	...	.16⅝	.16⅝	.19⅝	.13¼	.19½
No. 2 ....lb.	...	.12¼	.12¼	.15¾	.10½	.16⅜
No. 3 ....lb.	...	.07⅛	.07⅛	.09	.05¼	.09⅛
Chips ....lb.	...	.11	.11	.12½	.09¼	.12½
Dust ....lb.	...	.07⅛	.07⅛	.09	.05¼	.09⅛
Seeds ....lb.	...	.09⅞	.09⅞	.10½	.07⅜	.10½
Elemi, cns, c-l ....lb.	...	.08½	.10⅛	.11⅝	.08⅛	.12⅝
Ester ....lb.	.06¼	.06¾	.06¼	.06¾	.05	.07
Gamboge, pipe, cases .....lb.	.75	.80	.70	.75	.55	.80
Powd, bbls ....lb.	.80	.85	.75	.80	.60	.85
Ghatti, sol, bgs ....lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls, bxs, drs ...lb.	.14	.33	.14	.33	.14	.33
Kauri, NY						
Brown XXX, cases ....lb.	...	.60	...	60	.60	.60½
BX ....lb.	...	.38	...	.38	...	.38
B1 ....lb.	...	.28	...	.28	...	.28
B2 ....lb.	...	.24	...	.24	...	.24
B3 ....lb.	...	.18½	...	.18½	...	.18½
Pale XXX ....lb.	...	.61	...	.61	...	.61
No. 1 ....lb.	...	.41	...	.41	...	.41
No. 2 ....lb.	...	.24	...	.24	...	.24
No. 3 ....lb.	...	.17¾	...	.17¾	...	.17¼
Kino, tins ....lb.	2.00	2.10	2.00	4.50	2.50	4.50
Mastic ....lb.	1.50	1.60	.85	2.50	.55	.90
Sandarac, prime quality, 200 lb bgs & 300 lb cks ..lb.	.50	.55	.35	.37	.15	.37
Senegal, picked bags .....lb.	...	.30	...	.30	.25	.30
Sorts ....lb.	...	.13	...	.13	.09¼	.13
Thus, bbls ....280 lbs.	15.00	15.25	15.00	15.25	13.50	15.25
Tragacanth, No. 1, cases ..lb.	3.50	3.75	2.65	3.50	2.25	2.50
No. 2 ....lb.	3.35	3.60	2.55	3.35	1.90	2.40
No. 3 ....lb.	2.90	3.10	2.45	2.90	1.60	2.25
Yacca, bgs ....lb.	.03½	.04	.03½	.04	.03½	.08

H

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Helium, cyl (200 cu. ft.) cyl.		25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls lb.	.20	.30	.20	.30	.20	.34
Hemlock, 25%, 600 lb bbls. wks ....lb.	...	.03⅛	.03⅛	.03⅜	.03	.03⅛
tks ....lb.	...	.02¾	.02¾	.03	.02⅝	.02¼
Hexalene, 50 gal drs, wks lb.	...	.30	...	.80	...	.30

	Current Market	1940 Low	1940 High	1939 Low	1939 High
Hexane, normal 60-70° C.					
Group 3, tks ....gal.	...	.10½	...	.10½	...	.10½
Hexamethylenetetramine,					
powd, drs ....lb.	.32	.33	.32	.33	.32	.36
Hexyl Acetate, secondary,					
delv, drs ....lb.	.13	.13½	.13	.13½	.13	.13½
tks ....lb.	...	.12		.12		.12
Hoof Meal, f.o.b. Chicago unit	2.50	2.75	2.00	3.15	2.50	3.25
Hydrogen Peroxide, 100 vol,					
140 lb cbys ....lb.	.16	.18½	.16½	.20	.19½	.20
Hydroxylamine Hydro-					
chloride ....lb.	...	3.15	...	3.15		3.15
Hypernic, 51°, 600 lb bbls lb.	...	.14	...	.14	.13	.21
I					
Indigo, Bengal, bbls .....lb.	1.63	1.67	1.63	1.67		2.40
Synthetic, liquid ....lb.	.16½	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars..lb.	...	1.75	1.75	2.50	1.75	2.00
Irish Moss, ord, bales ....lb.	.25	.28	.15	.28	.10	.10
Bleached, prime, bales...lb.	.32	.35	.28	.35	.19	.20
Iron Acetate Liq. 17°, bbls					
delv ....lb.	.03	.04	.03	.04	.03	.04
Chloride see Ferric Chloride.					
Nitrate, coml, bbls 100 lb.	3.50	4.00	2.75	4.00	2.32	3.11
Isobutyl Carbinol (128-132° C)					
drs, frt all'd ....lb.	...	.22½	.22½	.34	.33	.34
tks, frt all'd ....lb.	...	.21½	.21½	.32	...	.32
Isopropyl Acetate, tks, frt					
all'd ....lb.	...	.06½	.05½	.06½	.051	.06
drs, frt all'd ....lb.	.07	.07½	.06½	.07½	.061	.07
Ether, see Ether, isopropyl.					
Keiselguhr, dom bags, c-l,					
Pacific Coast ....ton	22.00	25.00	22.00	35.00	22.00	35.00
L					
Lead Acetate, f.o.b. NY, bbls,					
White, broken ....lb.	...	.11	...	.11	.10	.11
cryst, bbls ....lb.	...	.11	...	.11	.10	.11
gran bbls ....lb.	...	.11¾	...	.11¾	.10¾	.11¾
powd, bbls ....lb.	...	.11¾	...	.11¾	.10¾	.11¾
Arsenate, East, drs .....lb.	.09	.09½	.08½	.11	.10	.11½
Linoleate, solid, .bbls ..lb.		.19	...	.19	...	.19
Metal, c-l, NY .....100 lb.	5.65	5.70	4.90	5.70	4.75	5.55
Nitrate, 500 lb bbls, wks lb.	.11	.14	.11	.14	.10	.12
Oleate, bbls ....lb.	.18½	.20	.18½	.20	.18½	.20
Red, dry, 95% Pb_3O_4,					
delv ....lb.	...	.08	.07½	.0815	.07¼	.08½
97% Pb_3O_4, delv ....lb.	...	.0850	.0765	.0848	.07½	.0835
98% Pb_3O_4, delv ....lb.	...	.0875	.08	.0865	.07¾	.0860
Resinate, precip, bbls...lb.	...	.16½	...	.16½		.16½
Stearate, bbls ....lb.	...	.25	...	.26	.22	.25
Titanate, bbls, c-l, f.o.b.					
wks, frt all'd ....lb.	.10¼	...	.10	.10¼	.11	.11½
White, 500 lb bbls, wks, lb.	...	.07½	.07	.07½	...	.07
Basic sulfate, 500 lb bbls,					
wks ....lb.	...	.06½	.06¼	.06½	...	.06¼
Lime, chemical quicklime,					
f.o.b. wks, bulk .....ton	7.00	13.00	7.00	13.00	7.00	8.00
Hydrated, f.o.b. wks ...ton	8.50	16.00	8.50	16.00	8.50	12.00
Lime Salts, see Calcium Salts					
Lime, sulfur, dealers, tks gal.	...	.07½	.07½	.11½	.08	.11½
drs ....gal.	.10	.14	.11	.16	.11	.16
Linseed Meal, bgs ....ton	27.00	28.00	23.50	37.00	34.00	42.00
Litharge, coml, delv, bbls lb.	.0725	.074	.06½	.07½	.06¼	.071
Lithopone, dom, ordinary,					
delv, bgs ....lb.	...	.036	...	.036	.03¾	.04⅛
bbls ....lb.	...	.0385	.03¾	.03¾	.04	.04⅜
High strength, bgs .....lb.	...	.05	...	.05	.05¼	.05⅝
bbls ....lb.	...	.05¼	...	.05¼	.05½	.05¾
Titanated, bgs ....lb.	...	.05¼	...	.05¼	.05¼	.05⅝
bbls ....lb.	...	.05½	...	.05½	.05½	.05⅞
Logwood, 51°, 600 lb bbls lb.	.10½	.12½	.10½	.12½	.09½	.12½
Solid, 50 lb boxes .....lb.	.16½	.20½	.16½	.20½	.15	.20½
M					
Madder, Dutch ....lb.	.22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbls ton	65.00	70.00	58.00	70.00	58.00	66.00
Magnesium Carb, tech, 70					
lb bgs, wks ....lb.	...	.06¼	...	.06¼	.05¾	.06½
Chloride flake, 375 lb bbls,					
c-l, wks ....ton	...	32.00	32.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb					
bbls, wks ....lb.	.10	.10½	.10	.10½	.10	.10½
Oxide, calc tech, heavy					
bbls, frt all'd ......lb.	...	.26	.25	.30	.25	.30
Light bbls above basis lb.	...	.26	.20	.26	.20	.25
USP Heavy, bbls, above					
basis ....lb.	...	.26	.25	.30	.25	.30
Palmitate, bbls ....lb.	.33	nom.	.33	nom.	.33	nom.
Silicofluoride, bbls .....lb.	.11	.11½	.11	.11½	.09½	.11½
Stearate, bbls ....lb.	.23	.26	.23	.27	.21	.24
Manganese, acetate, drs ..lb.	...	.26½	...	.26½	...	.26½
Borate, 30%, 200 lb bbls lb.	.15	.16	.15	.16	.15	.16
Chlorate, 600 lb cks ....lb.	...	.08½	...	.08½	.07½	.12
Dioxide, tech (peroxide),					
paper bgs, c-l ....ton	...	70.00	62.50	70.00	47.50	66.50
Hydrate, bbls ....lb.	...	.82	...	.82	...	.32
Linoleate, liq, drs .....lb.	.18	.19½	.18	.19½	.18	.19¾
solid, precip, bbls ....lb.		.19	...	.19	...	.19
Resinate, fused, bbls ...lb.	.08¼	.08½	.08¼	.08½	.08¼	.08½
precip, drs ....lb.		.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-					
95%, 550 lb drs .....lb.	.10½	.10¾	.08	.09¾	.07	.08½
Mangrove, 55%, 400 lb bbls lb.						.04
Bark, African ....ton	34.00	...	30.00	39.50	23.00	35.00

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Mannitol, pure cryst, cs, wks lb.	...	.90	.90	1.00	.95	1.20
commercial grd, 250 lb bbls ... lb.	.38	.45	.38	.50	.42	.57
Marble Flour, blk ... ton	12.00	14.00	12.00	14.00	12.00	14.00
Mercury chloride (Calomel) lb.	...	2.70	2.45	2.95	1.36	2.57
Mercury metal .. 76 lb. flasks	163.00	...	163.00	228.50	95.00	170.00
Mesityl Oxide, f.o.b. dest., tks ... lb.	...	.15	...	.15	.10½	.15
drs, c-l ... lb.	...	.16	...	.16	.11½	.16
drs, lcl ... lb.	...	.16½	...	.16½	.12	.16½
Meta-nitro-aniline ... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ... lb.	1.05	1.10	1.05	1.40	1.30	1.55
Meta-phenylene diamine 300 lb bbls ... lb.	...	.65	...	.65	.80	.84
Meta-toluene-diamine 300 lb bbls ... lb.	...	.65	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l frt all'd ... gal.	...	.45	...	.45	.41	.46
tks, frt all'd ... gal.	...	.40	...	.40	.35	.40
Pure, drs, c-l, frt all'd gal.	...	.35½	.35	.38	...	.38
tks ... gal.	...	.30	.30	.33	...	.33
95%, tks ... gal.	...	.29	.28	.31	...	.31
97%, tks ... gal.	...	.30	.29	.32	...	.32
Methyl Acetate, tech tks, delv ... lb.	.06	.07	.06	.07	.06	.06½
55 gal drs, delv ... lb.	.07	.08	.07	.08	.07	.08
C.P. 97-99%, tks, delv lb.	.09½	10½	.09½	.10½	...	.06¼
55 gal drs, delv ... lb.	.10½	.11½	.10½	.11½	.07¼	.07¼
Acetone, frt all'd, drs gal. *p*	...	.37½	.41	.44	.30	.44
tks, frt all'd ... gal. *p*	...	.32	.35	.39	.25	.35
Synthetic, frt all'd, east of Rocky M., drs ... gal. *p*	...	.37½	.36	.44	.38	.41
tks, frt all'd ... gal.	...	.32	.32	.36	...	.31½
West of Rocky M., frt all'd, drs ... gal *p*	...	.41½	.41½	.48	...	.42
tks, frt all'd .. gal. *p*	...	.35	.35	.45½	...	.35
Anthraquinone ... lb.	...	.83		.83		.83
Butyl Ketone, tks ... lb.	...	.10½		.10½		.10½
Cellulose, 100 lb lots, frt all'd ... lb.	...	.55	.55	.70	...	...
less than 100 lbs. f.o.b. wks ... lb.	...	.60	.60	.75	...	...
Chloride, 90 lb. cyl ... lb.	.32	.40	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd lb.	...	.06	.05½	.06	.05	.05½
50 gal drs, frt all'd, c-l lb.	.07	.07½	.06½	.07½	.06	.07
Formate, drs, frt all'd .. lb.	...	.89	...	.89	.35	.39
Hexyl, Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd .. lb.	...	.80	...	.80	...	.30
Mica, dry grd, bgs, wks .. ton	...	30.00	...	30.00	...	30.00
Michler's Ketone, kgs ... lb.	...	2.50	...	2.50	...	2.50
Monoamylamine, c-l, drs, wks lb.	...	.52	...	.52	...	.52
lcl, drs, wks ... lb.	.53	.55	.53	.55	...	...
tks, wks ... lb.	...	.50	...	.50	...	...
Monobutylamine, drs, c-l, wks ... lb.	...	.50	...	.50	.50	.65
lcl, wks ... lb.	.51	.53	.51	.53	...	...
tks, wks ... lb.	...	.48	...	.48	...	...
Monochlorobenzene, see "C"						
Monoethanolamine, tks, wks, lb.	.	.23	...	.23	...	.23
Monoethylamine (100% basis) lcl, drs, f.o.b. wks ... lb.	...	.65	...	.65	...	...
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparamiosulfate, 100 lb drs ... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Morpholine, drs 55 gal, lcl wks ... lb.	...	.75	...	.75	...	...
Myrobalans 25%, liq bbls lb.	no prices		no prices		.03¼	.04¼
50% Solid, 50 lb boxes lb.	no prices		no prices		.04¼	.05
J1 bgs ... ton	...	35.00	28.50	40.00	24.00	50.00
J2 bgs ... ton	...	28.00	23.00	34.00	19.00	41.00
N						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ... gal.	..	.26	.26	.27	.26	.27
drs, c-l ... gal.	...	.31	.31	.32	.31	.32
Naphthalene, dom, crude bgs, wks ... lb.	2.25	2.50	2.25	2.75	2.25	2.85
imported, cif, bgs ... lb.	no prices		...	3.00	1.50	1.85
Balls, flakes, pks ... lb.	.06¼	.07¾	.06¼	.07¾	.06½	.07½
Balls, ref'd bbls, wks ... lb.	...	.07	.06¾	.07	.05¾	.06¾
Flakes, re'd, bbls, wks lb.	...	.07	.06¾	.07	.05¾	.06¾
Nickel Carbonate, bbls ... lb.	.36	.36½	.36	.36½	.36	.37½
Chloride, bbls ... lb.	.18	.20	.18	.20	.18	.20
Metal ingot ... lb.	.34	.36	.34	.35	...	.35
Oxide, 100 lb kgs, NY lb.	.35	.38	.35	.38	.35	.37
Salt, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate 55 lb drs ... lb.	...	.70	...	.70	.70	.76
Nitre Cake, blk ... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene redistilled, 1000 lb drs, wks ... lb.	.08	.09	.08	.10	.08	.10
tks ... lb.	..	.07	...	.07	.07	.07½
Nitrocellulose, c-l, lcl, wks lb.	.20	.29	.20	.29	.22	.29
Nitrogen Sol. 45½% ammon, f.o.b. Atlantic & Gulf ports, tks, unit ton, N basis	...	1.2158	.	1.2158	.	1.2158
Nitrogenous Mat'l, bgs imp unit	no prices		2.20	2.60	2.25	2.85
dom, Eastern wks ... unit	...	2.20	2.20	2.90	2.30	3.00
dom, Western wks ... unit	...	1.75	1.95	2.00	1.90	2.25
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ... lb.	.28	.29	.28	.30	.22	.23

a Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila., or N. Y.

		Current Market		1940 Low	1940 High	1939 Low	1939 High
Oak Bark Extract, 25%, bbls	lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03½
tks	lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks	lb.	...	.15	...	.15	.15	.17
Orange-Mineral, 1100 lb cks NY	lb.	.13½	...	.10½	.13½	.10¼	.10¾
Orthoaminophenol, 50 lb kgs	lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs	lb.	...	.70	.70	.74	.70	.74
Orthochlorophenol, drs	lb.	...	.32	...	.32	...	.32
Orthocresol, 30.4°, drs, wks	lb.	.16	.16½	.16	.16½	.14½	.17½
Orthodichlorobenzene, 1000 lb drs	lb.	.06	.07	.06	.07	.06	.07
Orthonitrochlorobenzene, 1200 lb drs, wks	lb.	.15	.18	.15	.18	.15	.18
Orthonitroparachlorphenol, tins	lb.	...	.75	...	.75	...	.75
Orthonitrophenol, 350 lb drs	lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks	lb.	...	.09	...	.09	.08	.10
Orthotoluidine, 350 lb bbls, lcl	lb.	...	.19	...	.19	.16	.19
Osage Orange, cryst, bbls	lb.	...	.21	...	.21	.17	.25
51° liquid	lb.	...	.10	...	.10	.07	.09

P

		Current Market		1940 Low	1940 High	1939 Low	1939 High
Paraffin, rfd, 200 lb bgs 122-127° M P	lb.	...	.057	.02¼	.0675	.03¾	.06¾
128-132° M P	lb.	.057	.0595	.057	.0705	.04	.0705
133-137° M P	lb.	.06¼	.06½	.06¼	.0755	.0465	.0755
Para aldehyde, 99%, tech, 110-55 gal drs, wks	lb.	.10	.11¼	.10	.11¼	.10	.16*
Aminoacetanilid, 100 lb kgs	lb.	...	.85	...	.85		.85
Aminohydrochloride, 100 lb kgs	lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs	lb.	...	1.05	...	1.05		1.05
Chlorophenol, drs	lb.	...	.32	...	.32	.30	.45
Dichlorobenzene 200 lb drs, wks	lb.	.11	.12	.11	.12	.11	.12
Formaldehyde, drs, wks	lb.	.23	.24	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls	lb	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks	lb.	...	.47	...	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks	lb.	...	.15	.15	.16	.15	.16
Nitro-orthotoluidine, 300 lb bbls	lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls	lb.	...	.35	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls	lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls	lb.	...	.30	...	.30	.30	.35
Phenylenediamine, 350 lb bbls	lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls	lb.	...	.70	.70	.75	.70	.75
tks, wks	lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks	lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks	lb.	...	.48	.48	.50	.48	.58
Paris Green, dealers, drs	lb.	.23	.25	.23	.26	.23	.26
Pentane, normal, 28-38° C, group, 3 tks	gal.	...	.08½		.08½	...	.08½
drs, group 3	gal.	.11½	.16	.11½	.16	.11½	.16
Perchlorethylene, 10 lb drs, frt all'd	lb.	.08	.08½	.08	.08¾	.08	.10½
Petrolatum, dark amber, bbls	lb.	...	.02¾	.02¾	.05	.02⅝	.05
White, lily, bbls	lb.	...	.04¾	.04¾	.08½	.05¼	.08½
White, snow, bbls	lb.	...	.05½	.05½	.09½	.06¼	.09½
Petroleum Ether, 30-60°, group 3, tks	gal.	...	.13½		.13½	.13	.13½
drs, group 3	gal.	...	.14½	.14½	.25½	.14	.25½

PETROLEUM SOLVENTS AND DILUENTS

		Current Market		1940 Low	1940 High	1939 Low	1939 High
Cleaners naphthas, group 3, tks ,wks	gal.	06⅞	.07	.06⅞	.07	.06⅜	.07
East Coast, tks, wks	gal.	.09	.10½	.09	.10½	.09	.10
Lacquer diluents, tks East Coast	gal.	.09½	.10	.09½	.10	.09	.12½
Group 3, tks	gal.	...	.07⅜	.07⅜	.07⅞	.07⅜	.08
Naphtha, V.M.P., East tks, wks	gal.	...	.09½	.09½	.10	.09	.10
Group 3, tks, wks	gal.	.06⅞	.07	.06⅜	.07⅞	.06⅜	.07
Petroleum thinner, 43-47, East, tks, wks	gal.	.08¾	.09½	.08¾	.09½	.08½	.10
Group 3, tks, wks	gal.	...	.05⅞	.05⅞	.07	.05⅜	.06
Rubber Solvents, stand grd, East, tks, wks	gal.	...	.09½	.09½	.10	.09	.10
Group 3, tks, wks	gal.	.06⅞	.07	.06⅜	.07⅞	.06⅜	.07
Stoddard Solvents, East, tks, wks	gal.	.08¾	.09½	.08¾	.09½	.08½	.10
Group 3, wks	gal.	.06⅜	.06½	.06⅜	.06½	.05⅞	.06½
Phenol, 250-100 lb drs	lb.	.12	.13¾	.12	.14¾	.13	.15½
tks, wks	lb.	...	.11	.11	.12	.12	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs	lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs	lb.	...	.17	...	.17	...	.17
Phenylhydrazine Hydrochloride, com	lb.		1.50		1.50	...	1.50
Phloroglucinol, tech, tins	lb.	15.00	16.50	15.00	16.50	15.00	16.50
CP, tons	lb.	20.00	22.00	20.00	22.00	20.00	22.00

* These prices were on a delivered basis.

Current

Phosphate Rock
Rosins

	Current	Market	1940 Low	1940 High	1939 Low	1939 High
Phosphate Rock, f.o.b. mines						
70% basis . . . . .ton	. . .	2.15	1.85	1.90	. . .	1.85
72% basis . . . . .ton	. . .	2.40	2.15	2.35	. . .	2.35
Florida Pebble, 68% basis ton	. . .	1.90	1.90	2.85	. . .	2.85
75-74% basis . . . . . . .ton	. . .	2.90	2.90	3.85	. . .	3.85
Tennessee, 72% basis . ton	. . .	4.50	. . .	4.50	. . .	4.50
Phosphorus Oxychloride 175 lb cyl . . . . .lb.	.15	.18	.15	.20	.16	.20
Red, 110 lb cases . . . . . .lb.	.40	.44	.40	.44	.40	.44
Sesquisulfide, 100 lb cs . . lb.	.38	.42	.38	.44	.38	.44
Trichloride, cyl . . . . .lb.	.15	.16	.15	.18	.15	.18
Yellow, 110 lb cs, wks lb.	.18	.20	.18	.20	.24	.30
Phthalic Anhydride, ,100 lb drs, wks . . . . .lb.	.14½	.15½	.14½	.15½	. . .	.14½
Pine Oil, 55 gal drs or bbls						
Destructive dist . . . . .lb.	.50	.55	.53	.56	.46	.48
Steam dist wat wh bbls gal.	. . .	.59	. . .	.59	. . .	.59
tks . . . . .gal.	. . .	54	. . .	.54	. . .	.54
Pitch Hardwood, wks . . .ton	23.75	24.00	23.75	24.00	23.75	24.00
Coaltar, bbls, wks . . . . .ton	. . .	19.00	. . .	19.00	. . .	19.00
Burgundy, dom, bbls, wks lb.	.06	.06½	.05½	.06½	.05½	.06½
Imported . . . . .lb.	no prices		no prices		.15	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls . . . . .bbl.	6.00	6.50	6.00	6.50	6.00	6.25
Platinum, ref'd . . . . .oz.	. . .	36.00	35.00	40.00	32.00	40.00
Potash, Caustic, wks, sol . . lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06½
flake . . . . .lb.	. . .	.07	.07	.07½	.07	.07⅜
liquid, tks . . . . .lb.	. . .	.02⅞	.02⅞	.03¾	. . .	.02⅞
Manure Salts, Dom 30% basis, blk . . . . .unit	. . .	.60	.53½	.58½	. . .	.58½
Potassium Abietate, bbls . . lb.	. . .	.08	.08	.09	. . .	.09
Acetate, tech, bbls, delv lb.	. . .	.26	. . .	.26	. . .	.26
Bicarbonate, USP, 320 lb bbls . . . . .lb.	. . .	.17	. . .	.18	. . .	.18
Bichromate Crystals, 725 lb cks* . . . . .lb.	.08⅞	.09¼	.08¾	.09¼	.08¾	.09¼
Binoxalate, 30 lb bbls . . lb.		.23		.23	. . .	.23
Bisulfate, 100 lb kgs . . . lb.	.15½	.18	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks . . . . .lb.	.06½	.06¾	.06½	.07	.06½	.07
liquid, tks . . . . .lb.	. . .	.0275	.0275	.03	. . .	.02⅞
drs, wks . . . . .lb.	.03	.03⅛	.03	.03½	.03	.03½
Chlorate crys, 112 lb kgs, wks . . . . .lb.	. . .	.11	.10½	.13	.09¼	.13
gran, kgs . . . . .lb.	.12	.14½	.12	.14½	.12	.14½
powd, kgs . . . . .lb.	. . .	.10	.10	.12½	.08½	.12½
Chloride, crys, bbls . . . .lb.	.04	nom.	.04	.04¼	.04	.04¼
Chromate, kgs . . . . .lb.	.24	.27	.24	.27	.19	.28
Cyanide, drs . . . . .lb.	. . .	.55	.55	.75	.50	.55
Iodide, 250 lb bbls . . . . .lb.	. . .	1.20		1.35	1.13	1.35
Metabisulfite, 300 lb bbls lb.	nom.	.19	.13	.19	.11	.18
Muriate, bgs, dom, blk unit		.53½		.53½		.53½
Oxalate, bbls . . . . .lb.	.25	.26	.25	.26	.25	.26
Perchlorate, kgs, wks . . lb.	.09½	.11	.09½	.11	.09	.10½
Permanganate, USP, crys, 500 & 1000 lb drs, wks lb.	.20	.20½	.18½	.20½	.18½	.19½
Prussiate, red, bbls . . . .lb.	no prices		.38	.45	.30½	.45
Yellow, bbls . . . . .lb.	.16	.18	.15	.18	.14	.16
Sulfate, 90% basis, bgs ton	. . .	36.25	34.25	36.25	36.25	38.00
Titanium Oxalate, 200 lb bbls . . . . .lb.	. . .	.40	.40	.45	.35	.45
Pot & Mag Sulfate, 48% basis bgs . . . .**ton**	. . .	27.00	24.75	27.00	24.75	25.75
Propane, group 3, tks . . . .lb.	.03¾	.04	.03	.04⅜	.03	.04⅜
Putty, com'l, tubs . . . .100 lb.	. . .	3.15	. . .	6.00	3.00	6.00
Linseed Oil, kgs . . . .100 lb.	. . .	5.00	. . .	4.50	. . .	4.50
Pyrethrum, conc liq:						
2.4% pyrethrins, drs, frt all'd . . . . .gal.	4.75	4.95	4.75	7.50	5.75	7.50
3.6% pyrethrins, drs, frt all'd . . . . .gal.	. . .	7.20	7.20	11.00	8.45	11.00
Flowers, coarse, Japan, bgs . . . . .lb.	.23	.25	.23	.36	.26	.36
Fine powd, bbls . . . . . .lb.	.25	.26	.25	.37	.27	.37
Pyridine, denat, 50 gal drs gal.	. . .	1.71	. . .	1.71	1.63	1.71
Refined, drs . . . . .lb.	. . .	.48	. . .	.51	.50	.51
Pyrites, Spanish cif Atlantic ports, blk . . . . .unit	.12	.13	.12	.13	.12	.13
Pyrocatechin, CP, drs, tins lb.	2.15	2.40	2.15	2.40	2.15	2.75
Q						
Quebracho, 35% liq tks . . lb.	. . .	.03¾	.03¼	.03¾	.02⅞	.03⅜
450 lb bbls, c-l . . . . . .lb.	. . .	.04¼	.04	.04¼	.04	.04⅛
Solid, 63%, 100 lb bales cif . . . . .lb.	. . .	.04⅞	.04½	.04⅞	.04	.04½
Clarified, 64% bales . . lb.	. . .	.05⅛	.04¾	.05⅛	.04¼	.04¾
Quercitron, 51 deg liq, 450 lb. bbls . . . . .lb.	.08½	.09½	.08½	.09½	.07½	.08½
Solid, drs . . . . .lb.	.11	.16½	.10	.16½	.10	.12
R						
R Salt, 250 lb bbls, wks lb.	. . .	.55	. . .	.55	. . .	.55
Resorcinol, tech, cans . . . .lb.	.68	.74	.75	.80	.75	.80
Rochelle Salt, cryst . . . . . .lb.	.29¼	.29¾	.22¼	.29¾	.17¾	.21¾
Powd, bbls . . . . .lb.	.28¼	.28¾	.21¾	.28¾	.16¾	.20¼
Rosin Oil, bbls, first run gal.	.45	.50	. . .	.50	.45	.47
Second run . . . . .gal.	.51	.56	.52	.56	.47	.49
Third run, drs . . . . .gal.	.52	.57	.56	.57	.51	.53
Rosins 600 lb bbls, 100 lb unit ex. yard NY:***						
B	2.02	2.09	1.80	2.45	4.60	5.45
D	2.08	2.18	1.87	2.48	4.95	5.70
E	2.07	2.18	1.95	2.51	5.20	6.40
F	2.08	2.18	2.10	2.51	5.50	6.75
G	2.18	2.36	2.10	2.48	5.75	7.00
H	2.27	2.40	2.10	2.48	5.75	7.10
I	2.40	2.50	2.10	2.54	5.77½	7.20

* Spot prices are ⅛c higher; *** Dec. 31—1939, high and low based on 280 lb. unit.

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Rosins (continued)						
K	...	2.75	2.12	2.75	5.80	7.20
M	...	2.75	2.20	2.81	5.90	7.25
N	...	2.85	2.39	2.85	6.75	7.40
WG	...	3.17	2.68	3.17	6.95	7.70
WW	...	3.40	3.00	3.40	7.45	8.50
Rosins, Gum, Savannah (280 lb. unit):**						
B	1.37	1.44	1.15	1.80	3.25	4.00
D	1.43	1.53	1.22	1.83	3.55	4.30
E	1.42	1.53	1.30	1.86	3.80	5.00
F	1.42	1.52	1.45	1.86	4.00	5.35
G	1.53	1.71	1.45	1.83	4.40	5.70
H	1.62	1.75	1.45	1.83	4.40	5.70
I	1.75	1.85	1.45	1.89	4.40	5.80
K	2.08	2.10	1.47	2.10	4.40	5.80
M	...	2.12	1.55	2.16	4.40	5.85
N	...	2.20	1.70	2.20	5.10	6.00
WG	...	2.52	2.03	2.52	5.60	6.30
WW	...	2.75	2.25	2.75	6.05	7.10
X	...	2.75	2.35	2.75	5.60	7.10
Rosin, Wood, c-l, FF grade, NY	1.40	1.54	1.40	1.54	5.35	6.80
Rotten Stone, bgs mines ton	25.50	37.50	25.50	37.50	22.50	37.50
Imported, lump, bbls ...lb.	no prices		...	.14	...	.14
Powdered, bbls ......lb.	no prices		.08½	.10	.08½	.10
S						
Sago Flour, 150 lb bgs ..lb.	.03½	.04	.04	.04½	.02½	.04½
Sal Soda, bbls wks ...100 lb.	...	1.20	...	1.20	...	1.20
Salt Cake, 94-96%, c-l, bulk wks ......ton	...	17.00	...	17.00	19.00	25.00
Chrome, c-l, wks ......ton	...	16.00	11.00	16.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls ......lb.	...	.08	.071	.08	.06½	.069
Cryst, bbls ......lb.	.	.08¾	.081	.08¾	.07½	.0865
Powd, bbls ......lb.	.09	.10	.081	.10	.07½	.079
Satin, White, pulp, 550 lb bbls ......lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs .... lb.	...	.46	.46	.48	.46	.48
Shellac, Bone dry, bbls ..lb. s	.26	.27	.23	.27	.18	.26
Garnet, bgs ......lb.	.19	.20	.18½	.23	.12½	.20
Superfine, bgs ......lb. s	.15½	.16	.14½	.20½	.10	.21
T. N., bgs ......lb. s	.15	.15½	.13½	.19½	.09½	.20
Silver Nitrate, vials .....oz.	...	.26⅞	.26⅞	.27⅜	.26⅞	.33½
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs, c-l, wks ......100 lb.		1.10	...	1.10	...	1.10
58% light, bgs .....100 lb.	1.05	1.08	1.05	1.08	...	1.08
blk ......100 lb.		.90		.90	...	.90
paper bgs ......100 lb.	1.05	1.08	1.05	1.08	...	1.05
bbls ......100 lb.	...	1.45	1.35	1.45	...	1.35
Caustic, 76% grnd & flake, drs ......100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .....100 lb.	...	2.30	...	2.30	2.10	2.30
Liquid sellers, tks ..100 lb.	...	1.95	1.95	1.97½	...	1.97½
Sodium Abietate, drs .....lb.	...	.11	...	.11	...	.11
Acetate, 60% tech, gran, powd, flake, 450 lb bbls wks ......lb.	.04	.05	.04	.05	.04	.05
90%, bbls, 275 lb delv lb.	.06	.06¾	.06	.06¾	...	...
anhyd, drs, delv .....lb.	.08¼	.10	.08¼	.10	.08¼	.10
Alginate, drs ......lb.	.39	.70	.39	.96	.70	.95
Antimoniate, bbls ......lb.	.14½	.15	.14½	.15	.11½	.16
Arsenate, drs ......lb.	.07	.08¾	.07	.08¾	.08	.08½
Arsenite, liq, drs .....gal.	...	.35	...	.35	.30	.35
Dry, gray, drs, wks ..lb.	.06½	.09¼	.06½	.09½	.07½	.09½
Benzoate, USP kgs ....lb.	.46	.50	.46	.52	.46	.48
Bicarb, powd, 400 lb bbl, wks ......100 lb.	...	1.70	1.70	1.85	...	1.85
Bichromate, 500 lb cks, wks* ......lb.	.06⅞	.07¼	.06¾	.07¼	.06¾	.07¼
Bisulfite, 500 lb bbls, wks lb.	.03	.031	.03	.031	.031	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.30	1.80	1.40	1.80
Chlorate, bgs, wks .....lb.	...	.06¼	.06¼	.08½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks ......lb.	.14	.15	.14	.15	.14	.15
Diacetate, 33-35% acid, bbls, lcl, delv ......lb.	...	.09	.08½	.09	...	.09
Fluoride, white 90%, 300 lb bbls, wks ......lb.	.07	.08	.07	.08	.07	.08¾
Hydrosulfite, 200 lb bbls, f.o.b. wks ......lb.	.17	.18	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	2.80	3.05	...	2.80
Tech, reg cryst, 375 lb bbls, wks ......100 lb.	2.45	...	2.45	2.80	2.45	2.80
Iodide, jars ......lb.	...	2.42	2.30	2.42	...	2.30
Metanilate, 150 lb bbls ..lb.	.41	nom.	.41	.42	.41	.42
Metasilicate, gran, c-l, wks ......100 lb.	...	2.35	...	2.35	2.20	2.35
cryst, drs, c-l, wks 100 lb.	...	3.05	...	3.05	2.90	3.05
Anhydrous, wks, cl, drs ......100 lb.	3.75	3.75	3.75	3.75	3.75	3.75
wks, lcl, drs, ..100 lb.	5.05	5.05	5.05	5.05	5.05	5.05
Monohydrated, bbls ....lb.	...	.023	...	.023	...	.023
Naphthenate, drs .....lb.	.12	.19	.12	.19	.12	.19
Naphthionate, 300 lb bbl lb.	...	.50	...	.50	.50	.54
Nitrate, 92% crude, 200 lb. bgs, c-l, NY ......ton	...	28.70	...	28.30	...	28.30
100 bgs, same basis ..ton	...	29.40	...	29.00	...	29.00
Bulk ......ton	...	27.00	...	27.00	...	27.00
Nitrite, 500 lb bbls ....lb.	.06¾	.11½	.06¾	.11½	.06¾	.11½
Othochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25	.27	.25	.27	.25	.27
Orthosilicate, 300 lb drs, c-l ......lb.	...	.03	...	.03	...	.03
Perborate, drs, 400 lb ..lb.	.14¾	.15¼	.14¾	.15¼	.14¾	.15¼

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ⅛c higher. ** Dec. 27—1939, high and low based on 280 lb. unit.

Current

Sodium Peroxide
Thiocarbanilid

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Sodium (continued):						
Peroxide, bbls, 400 lb . . lb.	...	.17	...	.17	...	.17
Phosphate, di-sodium, tech. 310 lb bbls, wks 100 lb.	...	2.30	...	2.30	2.05	2.30
bgs, wks ...... 100 lb.	...	2.10	...	2.10	1.85	2.10
Tri-sodium, tech, 325 lb bbls, wks ...... 100 lb.	...	2.45	...	2.45	2.20	2.45
bgs, wks ...... 100 lb.	...	2.25	...	2.25	2.00	2.25
Picramate, 160 lb kgs . lb.	...	.65	.65	.67	.65	.67
Prossiate, Yellow, 350 lb bbls, wks .... lb.	.10½	.10¾	.09½	.10¾	.09½	.10¾
Pyrophosphate, anhyd, 100 lb bbls f.o.b. wks frt eq lb.	...	.051	...	.0530	...	.0530
Sesquisilicate, drs, c-l, wks .... 100 lb.	...	2.00	2.00	2.90	2.80	2.90
Silicate, 60°, 55 gal drs, wks .... 100 lb.	1.40	1.80	1.40	1.80	1.65	1.70
40°, 55 gal drs, wks 100 lb	...	.80	...	.80	...	.80
tks, wks .... 100 lb.	...	.65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY .... lb.	no prices		no prices		.03½	.04¾
Stannate, 100 lb drs .... lb.	.32½	.35½	.31½	.35½	.30	.35
Stearate, bbls .... lb.	.19	.24	.19	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16	.18	.16	.18	.16	.18
Sulfate, Anhyd, 550 lb bgs c-l, wks ...... 100 lb. *t*	1.45	1.65	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb. bbls, wks .... lb.	.02¼	.03	.02¼	.03	.02¼	.02½
Solid, 650 lb drs, c-l, wks . . lb.	.03	.03¼	.03	.03¼	.03	.03½
Sulfite, powd, 400 lb bbls wks .... lb.	...	.05¼	.023	.05¼	.023	.02½
Sulfocyanide, drs ...... lb.	.28	.47	.28	.47	.28	.47
Sulforicinoleate, bbls . . lb.	...	.12	...	.12	...	.12
Supersilicate (see sodium sesquisilicate)						
Tungstate, tech, crys, kgs lb.	no prices		no prices		1.05	1.10
Sorbitol, com, solut, wks c-l, drs, wks .... lb.	...	.14¾	.14¾	.16	...	.15½
Spruce, Extract, ord, tks . . lb.	...	.01⅛	...	.01⅛	...	.01⅛
Ordinary, bbls ..... lb.	...	.01⅝	...	.01⅝	...	.01⅝
Super spruce ext, tks . . lb.	...	.01⅜	...	.01⅜	...	.01⅜
Super spruce ext, bbls . . lb.	...	.01⅞	...	.01⅞	..	.01⅞
Super spruce ext, powd, bgs .... lb.	...	.04	...	.04	...	.04
Starch, Pearl, 140 lb bgs 100 lb.	...	2.95	2.50	2.95	2.40	2.85
Powd, 140 lb bgs . . . 100 lb.	...	3.05	2.60	3.05	2.50	2.90
Potato, 200 lb bgs ..... lb.	.04½	.05½	.05	.07½	.04	.06¾
Imp, bgs .... lb.	no prices		...	.06½	.05	.06½
Rice, 200 lb bbls . . lb.	.07½	.08½	.07¼	.08½	.06¼	.07¼
Sweet Potato, 240 lb bbls, f.o.b. plant ...... 100 lb.	nom.	7.00	5.50	7.00	5.50	7.50
Wheat, thick, bgs .... lb.	...	.05	.05¼	.05½	.05	.05½
Strontium, carbonate, 600 lb bbls, wks .... lb.	no prices		.22	.23	.16	.24
Nitrate, 600 lb bbls, NY lb.	.07¾	.08¾	.07¾	.08¾	.07¾	.08¼
Sucrose, octa-acetate, den, grd, bbls, wks ...... lb.	...	.45	...	.45	...	.45
tech, bbls, wks ...... lb.	...	.40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	.	16.00	...	16.00	.	16.00
Flour, com'l, bgs . . . 100 lb.	1.40	1.95	1.40	2.35	1.65	2.35
bbls .... 100 lb.	1.95	2.50	1.95	2.70	1.95	2.70
Rubbermakers, bgs . . 100 lb.	..	2.00	2.00	2.80	2.20	2.80
bbls .... 100 lb.	...	2.35	2.35	3.15	2.55	3.15
Extra fine, bgs ..... 100 lb.	...	2.35	2.85	3.00	2.85	3.00
Superfine, bgs ..... 100 lb.	2.65	2.80	2.65	2.80	2.65	2.80
bbls .... 100 lb.	2.25	3.10	2.25	3.10	2.25	3.10
Flowers, bgs .... 100 lb.	2.80	3.35	2.80	3.75	3.00	3.75
bbls .... 100 lb.	3.15	3.70	3.15	4.10	3.35	4.10
Roll, bgs .... 100 lb.	2.15	2.70	2.15	3.10	2.35	3.10
bbls .... 100 lb.	2.30	2.85	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks .... lb.	.03	.08	.03	.08	.03	.04
Sulfur Dioxide, 150 lb cyl lb.	.07	.09	.07	.09	.07	.09
Multiple units, wks . . . lb.	.04½	.07	.04½	.07	.04½	.07
tks, wks .... lb.	.04	.06	.04	.06	.04	.05
Refrigeration, cyl, wks lb.	.16	.40	.16	.40	.16	.17
Mutiple units, wks .... lb.	.07½	.10	.07½	.10	.07½	.10
Sulfuryl Chloride .... lb.	.15	.40	.15	.40	.15	.40
Sumac, Italian, grd ..... ton	no prices		98.00	140.00	65.50	85.00
Extract, 42°, bbls ...... lb.	.06	.06¼	.06	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks .... ton	...	8.50	8.50	9.00	8.00	9.00
Run of pile ...... ton	...	8.00	8.00	8.50	7.50	8.50
Triple, 40-48%, a.p.a. bulk, wks, Balt. unit ...... ton	...	.68	.68	.70	..	.70
T						
Talc, Crude, 100 lb bgs, NY ton	14.00	16.00	14.00	15.00	13.00	15.00
Ref'd 100 lb bgs, NY ton	17.25	19.25	14.00	17.25	14.00	16.00
French, 220 lb bgs, NY ton	no prices		23.00	35.00	23.00	30.00
Ref'd, white bgs, NY ton	no prices		45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	no prices		64.00	70.00	60.00	70.00
Ref'd, white bgs,, NY ton	no prices		65.00	78.00	65.00	70.00
Tankage, Grd, NY . . . unit *u*	...	2.35	2.35	3.25	2.75	3.25
Ungrd .... unit *u*	...	2.35	2.35	3.25	2.75	5.00
Fert grade, f.o.b. Chgo unit *u*	...	2.35	2.20	3.50	2.50	4.50
South American cif unit *u*	...	2.60	2.50	3.50	3.00	4.00
Tapioca Flour, high grade, bgs .... lb.	.03	.05	.02¾	.05	.01¾	.05½
Tar Acid Oil, 15%, drs . . gal.	.22	.24	.22	.24	.21	.24
25% drs .... gal.	.25	.27	.25	.28	.25	.28
Tar, pine, delv, drs .... gal.	.26	.27	.26	.27	.25	.27
tks, delv, E. cities .... gal.	...	.21		.21	.20	.21
Tartar Emetic, tech, bbls lb.	..	.36¾	.34¾	.36¾	.27¾	.35
USP, bbls .... lb.	...	.42	.40	.42	.33	.40
Terpineol, den grade, drs lb.	.	.17		.17	...	.17
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08	.08½
Tetrachlorethylene, drs, tech lb.	.08	.09	.08	.09½	...	.09½
Tetralene 50 gal drs, wks lb.	...	.18	.12	.18	.12	.13
Thiocarbanilid, 170 lb bbls lb.	...	.24	.20	.25	.20	.25

t Bags 15c lower; *u* + 10.

Tin
Zein

Prices

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Tin, crystals, 500 lb. bbls, wks lb.	.38	.38½	.36	.40½	.35½	.39
Metal, NY ... lb.	* ...	.501	.45½	.55	.45½	.60
Oxide, 300 lb bbls, wks lb.	.54	.56	.51	.56	.50	.54
Tetrachloride, 100 lb drs, wks ... lb.	...	.25¾	.23	.26½	.23	.32
Titanium Dioxide, 300 lb bbls lb.	.13¾	.14	.13	.16	.13¼	.16
Barium Pigment, bbls .. lb.	.05¾	.06	.05¼	.06½	.05⅝	.06½
Calcium Pigment, bbls lb.	.05½	.05¾	.05	.06¼	.05⅜	.06½
Titanium tetrachloride, drs, f.o.b. Niagara Falls ... lb.	**.32**	**.45**	**.32**	**45**	**.32**	**.45**
Titanium trichloride 23% sol, bbls f.o.b. Niagara Falls lb.	**.22**	**.26**	**.22**	**.26**	**.22**	**.26**
20% solution, bbls ... lb.	**.175**	**.215**	**.175**	**.215**	**.175**	**.215**
Toluidine, mixed, 900 lb drs, wks ... lb.	...	**.26**	**.26**	**.27**	**.26**	**.27**
Toluol, 110 gal drs, wks gal.	...	**.32**	**.27**	**.32**	...	**.27**
8000 gal tks, frt all'd gal.	...	**.27**	**.22**	**.27**	...	**.22**
Toner Lithol, red, bbls ... lb.	**.55**	**.60**	**.55**	**.60**	**.55**	**.80**
Para, red, bbls ... lb.	**.70**	**.75**	**.70**	**.75**	**.70**	**.80**
Toluidine, bgs ... lb.	...	**1.05**	**1.05**	**1.35**	...	**1.35**
Triacetin, 50 gal drs, wks, lb.	...	**.26**	...	**.26**	...	**.26**
Triamyl Borate, lcl, drs, wks, lb.	...	**.27**	...	**.27**	...	**.27**
Triamylamine, c-l, drs, wks lb.	...	.87	...	.77	.77	1.25
lcl, wks, drs ... lb.	...	.90	.78	.90	...	...
tks, wks ... lb.	...	.85	...	.75	...	...
Tributylamine, lcl, drs, wks lb.	...	.70	.67	.70	...	.70
c-l, drs, wks ... lb.	...	.67	.66	.67	...	...
tks, wks ... lb.	...	.65	...	.65	...	...
Tributyl citrate, drs, frt all'd lb.	**.24**	**.26**	**.24**	**.35**	**.35**	**.45**
Tributyl Phosphate, frt all'd lb.	...	**.42**	...	**.42**	...	**.42**
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	**.08**	**.09**	**.08**	**.09**	**.08**	**.09½**
Tricresyl phosphate, tech, drs lb.	**.22**	**.36½**	**.22**	**.36½**	**.22**	**.37½**
Triethanolamine, 50 gal drs, wks ... lb.	...	**.19**	**.19**	**.22**	**.21**	**.22**
tks, wks ... lb.	...	**.18**	**.18**	**.20**	...	**.20**
Triethylamine, lcl, drs, f.o.b. wks ... lb.	...	**1.05**	...	**1.05**	...	...
Triethylene glycol, drs, wks lb.	...	**.26**	...	**.26**	...	**.26**
Trihydroxyethylamine Oleate, bbls ... lb.	...	**.30**	...	**.30**	...	**.30**
Stearate bbls ... lb.	...	**.30**	...	**.30**	...	**.30**
Trimethyl Phosphate, drs, lcl, f.o.b. dest ... lb.	...	**.50**	...	**.50**	...	**.50**
Trimethylamine, c-l, drs, frt all'd E. Mississippi ... lb.	...	**1.00**	...	**1.00**	...	**1.00**
Triphenylguanidine ... lb.	**.58**	**.60**	**.58**	**.60**	**.58**	**.60**
Triphenyl Phosphate, drs .. lb.	...	**.38**	...	**.38**	...	**.38**
Tripoli, airfloated, bgs, wks ton	...	**26.00**	**26.00**	**30.00**	**26.00**	**30.00**
Turpentine (Spirits), c-l, NY dock, bbls ... gal.	...	.44*	.32½	.40	.29	.35
Savannah, bbls ... gal.	...	.32*	.26½	.34	.23½	.29
Jacksonville, bbls ... gal.	**no prices**		.26	.34¾	.23½	.26¼
Wood Steam dist, drs, c-l, NY ... gal.	...	.37*	.27	.34½	.242	.34
Wood, dest dist, l-c-l, drs, delv E. cities ... gal.	...	.40*	.23	.32	.22	.25
U						
Urea, pure 112 lb cases .. lb.	...	.12	.12	.15½	.14½	.15½
Fert grade, bgs, c. i. f. S.A. points ... ton	no prices		...	110.00	95.00	110.00
Dom f.o.b., wks ... ton	...	85.00	85.00	101.00	95.00	101.00
Urea Ammonia, liq., nitrogen basis ... ton	...	121.50	...	121.50	...	...
V						
Valonia beard, 42%, tannin bgs ... ton	no prices		47.00	56.00	45.00	57.00
Cups, 32% tannin bgs .. ton	no prices		33.00	39.00	27.00	39.00
Extract, powd, 63% ... lb.	no prices		.0565	.06	.05	.06
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots ... lb.	...	**2.60**	...	**2.60**	**2.20**	**2.60**
Ex-guaiacol ... lb.	...	**2.50**	...	**2.50**	**2.10**	**2.50**
Ex-lignin ... lb.	...	**2.50**	...	**2.50**	**2.10**	**2.50**
Vermilion, English, kgs .. lb.	**no prices**		...	**2.76**	**1.50**	**2.97**
W						
Wattle Bark, bgs ... ton	37.50	39.50	34.00	38.75	34.50	40.00
Extract, 60°, tks, bbls .. lb.	...	.03⅞	.03⅞	.04¼	.04	.05½
Wax, Bayberry, bgs ... lb.	.19	.20	.25	.30	.16⅞	.39
Bees, bleached, white 500 lb slabs, cases ... lb.	...	.36½	.35	.38	.33	.40½
Yellow, African, bgs .. lb.	...	.30	.23	.29	.18½	.30
Brazilian, bgs ... lb.	.31	.32	.24	.31	.21	.33
Refined, 500 lb slabs, cases lb.	.35	.36	.29	.36	.25½	.36
Candelilla, bgs ... lb.	.19	.19½	.18	.19	.15¼	.19
Carnauba, No. 1, yellow, bgs ... lb.	.69	.69½	.58	.85	.36¾	.78
No. 2, yellow, bgs ... lb.	.68	.69	.57	.84	.35¾	.45
No. 2, N. C., bgs ... lb.	.67	.68	.46	.73	.34	.41
No. 3, Chalky, bgs ... lb.	.57	.57½	.43	.66	.27½	.46
No. 3, N. C., bgs ... lb.	.59	.60	.47	.68	.28¾	.49
Ceresin, dom, bgs ... lb.	.11	.11½	.11½	.15	.08½	.15
Japan, 224 lb cases ... lb.	.18	.18½	.15½	.16½	.09¾	.18
Montan, crude, bgs ... lb.	**no prices**		**no prices**		.11	.11¼
Paraffin, see Paraffin Wax.						
Spermaceti, blocks, cases lb.	.24	.25	.22	.25	.18	.25
Cakes, cases ... lb.	.25	.26	.23	.25	.19	.26
Wood Flour, c-l, bgs ... ton						
Gilders, bgs, c-l, wks .. ton	**16.00**	**20.00**	**12.00**	**20.00**	**12.00**	**14.00**
Whiting, chalk, com 200 lb	18.00	19.00	11.50	19.00	...	15.00
bgs, c-l, wks ... ton	**24.00**	**25.00**	**20.00**	**30.00**	**20.00**	**30.00**
Xylol, frt all'd, East 10° tks, wks ... gal.	...	**.29**	...	**.30**	**.29**	**.30**
Com'l tks, wks, frt all'd gal.	...	**.26**	...	**.27**	**.26**	**.27**
Xylidine, mixed crude, drs lb.	**.35**	**.36**	**.35**	**.36**	**.35**	**.36**
Zein, bgs, 1000 lb lots, wks ... lb.	...	**.20**	...	**.20**	...	...

* Dec. 27. ‡ May 31.

Current

Zinc Acetate
Oil, Whale

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Zinc Acetate, tech, bbls, lcl, delv ... lb.	.15	.16	.15	.16	.15	.21
Arsenite, bgs, frt all'd .. lb.	...	.12	.12	.12½	.12	.13
Carbonate tech, bbls, NY lb.	.14	.16	.14	.16	.14	.15
Chloride fused, 600 lb drs, wks ... lb.	...	.04¼	.04¼	.046	.04¼	.046
Gran, 500 lb drs, wks lb.	...	.05	.05	.05¾	.05	.05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	...	2.25
Cyanide, 100 lb drs ... lb.	...	.33	...	.33		.33
Dust, 500 lb bbls, c-l, delv lb.	...	.09¼	.07½	.08½	.06½	.08½
Metal, high grade slabs, c-l, NY ... 1000 lb.	...	7.65	5.90	7.64	4.84	6.40
E. St. Louis ... 100 lb.	...	7.25	4.60	7.25	4.60	6.00
Oxide, Amer, bgs, wks lb.	...	.06½	.06¼	.07½	.06¼	.07½
French 300 lb bbls, wks lb.	...	.06¾	.06¼	.07¾	.06½	.07¾
Palmitate, bbls ... lb.	.24½	.27½	.23	.27½	.23	.25
Resinate, fused, pale bbls lb.	...	.10		.10		.10
Stearate, 50 lb bbls ... lb.	...	.22	.21½	.24½	.20	.24½
Sulfate, crys, 40 lb. bbls wks ... lb.	...	.315	.0275	.029	...	.029
Flake, bbls ... lb.	...	.335	...	.0325	...	.0325
Sulfide, 500 lb bbls, delv lb.	...	.08	.07¾	.08	.07¾	.08⅞
bgs, delv ... lb.	...	.07¾	.07½	.07¾	.07½	.08⅝
Sulfocarbolate, 100 lb kgs lb.	.24	.29	.24	.26	.24	.26
Zirconium Oxide, crude, 70-75% grd, bbls, wks ton	75.00	100.00	75.00	100.00	75.00	100.00

Oils and Fats

	Current Market		1940 Low	1940 High	1939 Low	1939 High
Babassu, tks, futures ... lb.	nom.	.06	.05¾	.06⅝	.05⅞	.07⅝
Castor, No. 3, 400 lb drs lb.	nom.	.09¾	.09¾	.12¾	.08¼	.12¾
Blown, 400 lb drs .. lb.	nom.	.11¾	.11¾	.14¾	.10¼	.14¾
China Wood, drs, spot NY lb.	...	.27¼	.22½	.28	.15	.28
Tks, spot NY ... lb.	...	.26¼	.21½	.27	.14½	.27
Coconut, edible, drs NY .. lb.	...	.07½	.07½	.09⅜	.08⅛	.10⅛
Manila, tks, NY ... lb.	...	.03	.02¾	.03⅜	.02⅞	.04⅝
Tks, Pacific Coast ... lb.	.02⅝	.02¾	.02¾	.03½	.02⅝	.04⅜
Cod, Newfoundland, 50 gal bbls ... gal.	.	.60	.60	.72	.29	.72
Copra, bgs, NY ... lb.	nom.	.0145	.0165	.0190	.0160	.2625
Corn, crude, tks, mills ... lb.	.06⅛	.06¼	.05⅛	.06½	.05⅛	.07⅛
Refd, 375 lb bbls, NY .. lb.	.08⅝	.08¾	.07⅞	.09	.07½	.09¾
Degras, American, 50 gal bbls, NY ... lb.	.08	.08½	.08	.10	.07	.10
Greases, Yellow ... lb.	nom.	.04⅝	.03	.05¼	.03⅞	.06¾
White, choice, bbls, NY lb.	nom.	.05	.03⅜	.05⅝	.04½	.07½
Lard, Oil, Edible, prime .. lb.	..	.08½	.08	.10	.09	.11¼
Extra, bbls ... lb.	...	.08¼	.06¾	.09⅜	.08	.10⅜
Extra, No. 1, bbls ... lb.	...	.08	.06⅞	.08⅞	.07¾	.10⅛
Linseed, Raw less than 5 bbl lots ... lb.	.091	.092	.09	.116	.092	.119
bbls, c-l, spot ... lb.	.095	.096	.084	.110	.084	.111
Tks ... lb.	.084	.086	.078	.104	.078	.104
Menhaden, tks, Baltimore gal.	nom.	.30	.21	.35	.21	.35
Refined, alkali, drs ... lb.	.084	.088	.067	.088	.062	.082
Tks ... lb.	...	.078	.061	.087	.056	.076
Kettle boiled, drs ... lb.	.096	.10	.079	.10	.074	.094
Light pressed, drs ... lb.	.078	.082	.061	.085	.056	.076
Tks ... lb.	...	.072	.055	.072	.067	.069
Neatsfoot, CT, 20°, bbls, NY lb.	...	.15¼	.15¼	.19¼	.14¾	.19¼
Extra, bbls, NY ... lb.	...	.08¼	.06⅞	.09	.08	.10⅛
Pure, bbls, NY ... lb.	...	.10¾	.08	.14¼	.10¾	.16¾
Oiticica, bbls ... lb.	.18½	.19½	.17	.21	.09¼	.21
Oleo, No. 1, bbls, NY ... lb.	...	.07⅜	.07⅜	.07¾	.07¼	.12
No. 2, bbls, NY ... lb.	...	.07⅛	.07	.07½	.06¾	.11¾
Olive, denat, bbls, NY .. gal.	nom.	2.35	.94	2.40	.82	1.40
Edible, bbls, NY ... gal.	...	3.25	1.85	3.25	1.75	2.25
Foots, bbls, NY ... lb.	...	.10¼	.08	.10¼	.06¾	.10
Palm, Kernel, bulk ... lb.	no prices		no prices		.034	.036
Niger, cks ... lb.	nom.	.04¼	.03¼	.05½	.03⅝	.05½
Sumatra, tks ... lb.	..	.02	.02⅛	.03	.0265	.02¾
Peanut, crude, bbls, NY lb.		.09	.06¾	.09	.06	.08
Tks, f.o.b. mill ... lb.	nom.	.05¼	.05⅛	.07⅛	.05¼	.07¼
Refined, bbls, NY ... lb.	nom.	.08	.07⅜	.09¾	.08¾	.10¾
Perilla, drs, NY ... lb.		.18	.19	.21	.09½	.16½
Tks, Coast ... lb.	...	.17¼	.18½	.20	.089	.15¾
Pine, see Pine Oil, Chem. Sec.						
Rapeseed, blown, bbls, NY lb.	nom.	.17½	.17	.17½	.14	.17½
Denatured, drs, NY .. gal.	nom.	1.00	1.00	1.05	.80	1.05
Red, Distilled, bbls ... lb.	.06¾	.07¼	.06¼	.09½	.06¾	.09½
Tks ... lb.	...	.06¼	.05¾	.08	.064	.08½
Sardine, Pac Coast, tks .. gal.	nom.	.39	.31	.39	.24	.38
Refined alkali, drs ... lb.	.084	.088	.067	.088	.062	.082
Tks ... lb.	...	.078	.061	.078	.056	.076
Light pressed, drs ... lb.	.078	.082	.061	.082	.056	.076
Tks ... lb.	...	.072	.055	.072	.05	.07
Sesame, white, dom ... lb.	...	.07½	.07¼	.11¾	.09	.12
Soy Bean, crude						
Dom, tks, f.o.b. mills .. lb.	...	.05½	.04¾	.06¼	.04½	.06½
Crude, drs, NY ... lb.	.06¼	.07	.05¾	.07¾	.05⅛	.07⅝
Ref'd, drs, NY ... lb.	.07⅝	.08¼	.07¼	.08½	.06⅜	.09
Tks ... lb.	.06¾	.07½	.06¼	.07⅝	.05¾	.07¾
Sperm, 38° CT, bleached bbls, NY ... lb.	...	.11	.105	.11	.09	.103
45° CT, blchd, bbls, NY lb.	...	.103	.098	.103	.083	.096
Stearic Acid, double pressed dist bgs ... lb.	.09½	.10½	.09¾	.13	.10	.13½
Double pressed saponified bgs ... lb.	.09¾	.10¾	.10	.13¾	.10¼	.13¾
Triple pressed dist bgs lb.	.12½	.13½	.12½	.16½	.12¾	.16½
Stearine, Oleo, bbls ... lb.	nom.	.06⅜	.05¼	.06½	.05½	.12
Tallow City, extra loose .. lb.	...	.05	.03⅜	.05⅜	.04⅜	.07
Edible, tierces ... lb.	...	.04⅞	.04⅜	.05¾	.04½	.07¾
Acidless, tks, NY ... lb.	...	.07½	.06¼	.08	.07	.09¼
Turkey Red, single, drs .. lb.	...	.07	.082	.09	.06	.08⅝
Double, bbls ... lb.	...	.11	.11	.12¾	.08¾	.11¼
Whale:						
Winter bleach, bbls, NY lb.	...	095	...	.095	.075	.095
Refined, nat, bbls, NY lb.	...	.091	...	.091	.071	.091

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Mutual Chemical Co. of America, Inc. 5

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Natural Products Refining Co. 12
Niacet Chemicals Corp. 85
Niagara Alkali Company 8

Oldbury Electro-Chemical Co. 102

Pacific Coast Borax Co. 94
Paul & Co., Inc., Edward P. 100
Pennsylvania Coal Products Co. 92
Pfizer & Co., Inc., Chas. 33
Philadelphia Quartz Co. 90
Phosphate Mining Co. 89
Polachek, Z. H. 100
Pressed Steel Tank Co. 99
Prior Chemical Corporation 66

R. & H. Chemicals Department of du Pont de Nemours & Co., E. I. 11
Rosenthal Co., Inc., H. H. 92

Sharples Solvents Corp. 69
Sherwood Petroleum Company, Inc. 97
Singer, T. E. R. 83
Slomon, Ira I. 101
Solvay Sales Corporation .... Cover 2
Sprout, Waldron & Co., Inc. 98
Standard Alcohol Co. 94
Standard Silicate, Division of Diamond Alkali Co. 45
Starkweather Co., J. U. 100
Stauffer Chemical Co. 54
Stroock & Wittenberg Corp. 87
Stroock & Wittenberg Corp. 95

Tennessee Corp. 96
Texas Gulf Sulphur Co. 36
Turner & Co., Joseph 85

Union Carbide & Carbon Corp. 15
U. S. Industrial Chemicals, Inc. Insert facing pages 80 and 81
U. S. Stoneware Co. 77

Van Heeden, Arthur 83
Victor Chemical Works 39

Warner Chemical Co., Division Westvaco Chlorine Products Corp. 1
Wishnick-Tumpeer, Inc. .... Cover 4

"We"—Editorially Speaking

According to very reliable information, there were 15,893 requests for the miniature railroad which formed part of Victor Chemical's attractive display at the recent National Chemical Exposition at Chicago, including "We." But we also have it on equally reliable authority that the usually extremely good-natured August Kochs, was quite adamant—no railroad—no presidential O. K. of the bill for the booth.

That plant inspection trip of the American Institute of Chemical Engineers down the Mississippi from New Orleans to Freeport Sulphur's Grande Ecaille plant would have been more than well worth while if only to taste that barbecue. Only two secrets were kept from the visitors—the operation of the sulfur distillation unit and the formula for the barbecue sauce.

What with Freeport's barbecue, several expeditions to Antoines, La Louisianne, The "500" Club, Ga'latoire's, Broussard's, and not to forget The Absinthe House, etc., etc., the "Pipefitters" were hardly in gastronomic fettle to do full justice to Hercules Powder's spreads at Hattiesburg and Masonite's dinner at Laurel—but they did—and how!

One bright engineer, who really should be a salesman, suggested after the imposing array of company-provided spreads had been digested, that the secretary pick out 30 or 40 more plant visits, preferably located in the South, as a pleasant and inexpensive means of spending the winter months. Another "improved on the art" by suggesting that if the group overstayed slightly at each stopping off point, possibly the companies visited would also provide the railroad fares out of town!

Not Great Britain—but Laurel, Mississippi!

"Steve" Tyler, A. I. Ch. E. secretary, reveals that the waist lines of the members attending the New Orleans meeting expanded on an average three inches. He insists it was all very scientifically determined.

We wonder how the "pipefitters" on expense accounts sneaked in that sanitation charge?

According to several science editors the outstanding event of 1940 in science was the demonstration of the practical release of atomic energy. And according to one, John J. O'Neill, N. Y. *Herald-Tribune*, "It marks the beginning of an era in which it will bring about tremendous industrial, economic and social changes."

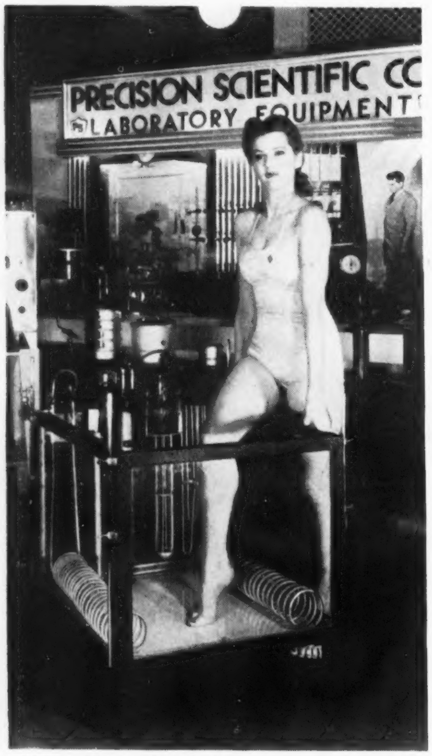
Did you know that it is now Berryville Plum Pudding Chew, not Chew, Chew and Chew?

Did you know also:—

That the Du Ponts still continue the French holiday custom, brought to this country in 1800 by members of the family, of holding "at home" receptions on New Year's Day?

That the Oregon Experiment Station has found a new chemical spray that makes holly shatterproof for several weeks?

That two thirds of the net income of Monsanto Chemical Company's American operations in the third quarter of 1940 was absorbed in taxes, according to a statement by Edgar M. Queeny, president of that company?



M. B. Kanter in his letter to us writes: "If the excitement the enclosed shot caused at the Chemical Show in Chicago is any index at all, we imagine your readers will welcome the picture, for all chemists—in spite of what is said about them—are all human!"

15 YEARS AGO

From Our Files of January, 1926

The Nichols Medal in chemistry for 1925 has been awarded by the New York Section of the American Chemical Society to Dr. Samuel Colville Lind, Associate Director of the U. S. Fixed Nitrogen Research Laboratory.

August Klipstein, pioneer dealer in chemicals and dyestuffs, head of A. Klipstein & Co., died Friday night, January 13.

Germany is rapidly increasing her exports of synthetic camphor, made from turpentine imported from the United States.

Dr. Richard B. Moore, manager of the Dorr Co., was awarded the 1925 Perkin medal by the American Section of the Society of Chemical Industry.

At a recent public session Surgeon General Hugh S. Cumming reported that the special committee appointed to study the public health question involved in manufacture of tetraethyl lead gasoline saw no reason to prohibit sale of this product.

1/29/41

State of Chemical Trade

Current Statistics (Dec. 31, 1940)—p. 72

WEEKLY STATISTICS OF BUSINESS

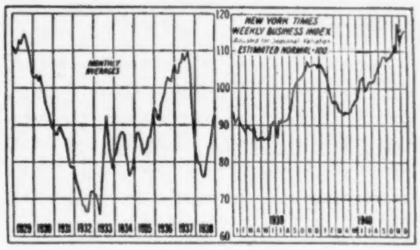
Week Ending	Carloadings 1940	Carloadings 1939	Carloadings % of Change	Electrical Output* 1940	Electrical Output* 1939	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Chem. & Drugs	Fertilizer Fats & Oils	Ass'n Price Indices Fert. Mat.	Ass'n Price Indices Mixed Fert.	Ass'n Price Indices All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher Commodity Index
Nov. 30	728,525	685,496	+ 6.3	2,795,634	2,538,777	+10.1	82.0	97.6	46.8	72.4	78.6	77.1	77.7	96.6	112.2	84.7
Dec. 7	738,513	683,973	+ 8.0	2,838,270	2,585,560	+ 9.8	81.9	97.9	46.9	72.3	78.6	77.1	77.6	96.9	113.8	85.0
Dec. 14	736,332	678,132	+ 8.6	2,862,402	2,604,558	+ 9.9	81.7	97.9	46.9	72.1	78.6	77.0	77.6	96.0	115.1	84.9
Dec. 21	700,242	651,386	+ 7.5	2,910,914	2,641,458	+10.2	81.6	97.9	46.4	71.9	78.8	77.0	77.7	96.8	115.7	84.9

* K.W.H. 000 omitted. † 1926-1928 = 100.00.

MONTHLY STATISTICS

CHEMICAL:	Nov. 1940	Nov. 1939	Oct. 1940	Oct. 1939	Sept. 1940	Sept. 1939
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	......	......	222,476	205,024	193,243	153,897
Consumpt. in mfr. fert.	......	......	169,878	175,338	140,444	134,287
Stocks end of month	......	......	105,557	75,377	103,532	74,113
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	......	......	......	20,965,125	21,559.233	18,104,177
Comp. denat. prod., wine gal	......	......	......	4,906,872	3,093,302	2,101,668
Removed, wine gal.	......	......	......	5,175,243	3,097,747	2,182,164
Stocks end of mo., wine gal.	......	......	......	412,987	738,171	685,736
Spec. denat. prod., wine gal.	......	......	......	10,274,257	10,600,276	10,523,022
Removed, wine gal.	......	......	......	10,277,452	11,058,758	10,665,895
Stocks end of mo., wine gal.	......	......	......	1,083.197	1,707.215	1,090,505
Ammonia sulfate prod., tons *a*	......	......	63,805.5	59,256	62,482.5	52,992
Benzol prod., gal. *b*	......	......	12,193,000	10,891,000	11,054,000	9,660,000
Byproduct coke prod., tons *a*	......	......	5,202,564	4,526,602	4,627,401	3,890,600
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	661,258	982,732	748,779	967,740	736,372	861,073
Sheets, ship., lbs.	730,381	861 442	767,010	884,318	745,068	840,886
Rods, prod., lbs.	306,670	286,736	248,384	262,792	256,678	219,012
Rods, ship., lbs.	305,657	295,438	273,758	262,835	282,714	239,439
Tubes, prod., lbs.	92,766	91,391	99,236	84,155	100,236	84,253
Tubes, ship., lbs.	94,958	86,820	95,183	84.127	85,636	76,123
Cellulose acetate, sheets, rod, tubes						
Production, lbs.	934,006	725,119	983,292	713,241	826,248	705,640
Shipments, lbs.	1.036,674	793,028	944,361	683,637	754,786	676.669
Molding comp., ship.; lbs.	1,410,496	1,119,050	1,783,269	1,332,699	1,501.463	1.152.791
Methanol (Bureau of the Census)						
Production, crude, gals.	467,976	479,622	463,165	463,420	365,786	404,876
Production, synthetic, gals.	4,439,905	4,611,707	4,408,026	4,158,161	3,548,808	2,639,934
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	......	......	3,303,892	3.722,046	2,698,218	3,291,353
Heavy goods, ship., linear yds.	......	......	2,538,265	2,760,091	2,408,096	2,215,824
Pyroxylin spreads, lbs. *e*	......	......	5,851.135	6,371,331	5,127,772	6,243,461
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	......	......	$17,596,783	$19,774	$16,664	$20,000
Crude sulfur *d*	......	......	$1,112	$1,547	$1,663	$874
Coal-tar chemicals *d*	......	......	$2,094	$1,798	$1,939	$1,114
Industrial chemicals *d*	......	......	$4,388	$5,160	$3,802	$4,152
Imports						
Chemicals and related prod. *d*	......	......	$3,436	$13,445	$3,051	$11,338
Coal-tar chemicals *d*	......	......	$577	$1,604	$445	$1,494
Industrial chemicals *d*	......	......	$1,036	$1,421	$574	$1,254
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	125.3	122.6	125.3	122.0	122.6	118.0
Other than petroleum	126.3	122.3	126.3	121.8	122.6	123.1
Chemicals	148.6	137.7	145.6	133.6	143.4	123.6
Explosives	147.2	106.1	144.9	104.2	147.8	99.9
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25 = 100) Adjusted to 1937 Census Totals						
Chemicals and allied prod., including petroleum	139.8	133.1	139.3	133.1	138.2	124.6
Other than petroleum	141.6	131.6	140.3	131.0	137.8	121.5
Chemicals	182.6	161.5	176.2	157.9	172.3	139.7
Explosives	186.6	127.6	180.9	125.2	175.4	114.4
Price index chemicals*	85.1	85.2	85.0	82.1	84.8	84.5
Drugs & Pharmaceuticals*	95.9	79.7	95.8	78.1	96.0	78.4
Fert. mat.*	69.9	69.8	68.1	70.6	68.1	67.2
Paint and paint mat.	85.7	84.9	84.8	85.7	84.1	84.7
FERTILIZER:						
Exports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	......	148,135	112,699	144,348	123,792
Total phosphate rock	......	......	94,709	58,402	82,336	58,113
Total potash fertilizers	......	......	15,363	7,648	12,552	17,214
Imports (long tons, Nat. Fert. Association)						
Fertilizer and fert. materials	......	......	64,940	112,411	68,128	87,434
Sodium nitrate	......	......	34,822	42,204	37,610	10,445
Total potash fertilizer	......	......	3	14,571	7,787	15,877

INDUSTRIAL TRENDS



Business: The year 1940 passed away with business and industrial activity at highest levels in years and in some cases at best on record. During last month, New York Times Index of Business Activity declined somewhat, but was still 7.4 points higher than the year end figure of 1939. Holiday season held some of the components of industrial activity down somewhat. Consumer purchasing and retail trade, however, experienced a very good season.

Steel: Output of steel ingots in December averaged about 93 per cent. of capacity. Decline from the high rate of approximately 97 per cent. during November is entirely due to the holiday season. In spite of the decline, December output is highest for any December on record. Nearest approach to this December's rate was in 1939 when an output of 89.13 per cent. was attained. December production is about 6,240,000 tons as compared with 6,282,824 tons in November. An important problem facing the industry is the matter of increasing capacity by plant expansion. Edward R. Stettinius, Jr., of the National Advisory Defense Commission along with several Government officials stress need for increased capacity. On the other hand, Ernest T. Weir, Chairman of the National Steel Corp. says that the steel industry has sufficient capacity to handle defense and private needs. He said that this year we will have an annual ingot capacity of 85,000,000 tons, whereas production over the past ten years has averaged 36,000,000 tons. Weir also said that if it were not for defense and war demands, the steel industry would be operating at 50 or 60 per cent. of capacity.

State of Chemical Trade
Current Statistics (Dec. 31, 1940)—p. 72

State of Chemical Trade

Current Statistics (Dec. 31, 1940)—p. 73

Electric Output: Power production continues to reflect rising industrial activity. Production extended its gains into record territory by reaching mark of 2,910,914,000 kwh, compared with 2,641,458,000 kwh in the like 1939 period, an increase of 10.2 per cent. Percentage gains by geographic areas were reported as follows by Edison Electric Institute: New England 6.7, Middle Atlantic 8.5, Central Industrial 12.5, West Central 8.7, Southern States 10.1, Rocky Mountain 12.3, Pacific Coast 9.

Automotive: Automotive production during November totaled 487,352 units, in spite of an expected slackening. The earlier estimates of a 450,000 unit production for December have been revised upward to approach 500,000.

On the sales side, a new November high was reached for factory sales of passenger cars and trucks with an approximate total of 514,500 units. This was 40 per cent. ahead of the 1939 figure. This high rate of sales has prevented manufacturers from achieving their aim of building up dealers stocks to 500,000 level.

Carloadings: Toward the middle of December carloadings strongly resisted the usual seasonal downward trend. Freight loadings in the week ended December 14 totaled 736,332 cars, the highest for any comparable week since 1930 when the aggregate was 744,353 cars. Present indications are that loadings will continue to achieve contra-seasonal increases and will find 1941 a very good year.

Textiles: Activity in the textile industries continued to increase sharply. At machinery plants and at cotton textile mills activity reached new high levels and at woolen mills output was close to the previous peak reached early in 1937. It is reported that rayon production in the U. S. in 1940 reached a record all-time high. Estimates of production were placed at 460,000,000 lbs. This represents an increase of 20 per cent. above 1939 which in turn was 33 per cent. over 1938.

Outlook: From a short-range viewpoint the future looks very bright so far as industrial activity is concerned. Contracts and plans for 1941 already provide a huge backlog that will keep things humming during 1941. However, it should be perfectly apparent that we are experiencing an artificial prosperity based on the urgent need for rapid and large-scale production for defense. When this need is ended there will be a reckoning which does not look pleasant from here.

MONTHLY STATISTICS (cont'd)

FERTILIZER: (Cont'd)	Nov. 1940	Nov. 1939	Oct. 1940	Oct. 1939	Sept. 1940	Sept. 1939
Superphosphate e (Nat. Fert. Association)						
Production, total	......	......	354,691	357,244	278,103	273,378
Shipments, total	......	......	317,425	287,103	371,539	351,057
Northern area	......	......	189,597	163,608	292,234	281,374
Southern area	......	......	165,094	193,636	79,305	69,683
Stocks, end of month, total	......	......	1,362,129	1,266,029	1,275,841	1,151,976
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	106,119	110,205	206,569	210,115	282,844	222,040
Total, 12 southern	105,003	108,139	188,799	190,065	142,636	154,413
Total, 5 midwest	1,116	2,066	17,770	20.050	100.208	67,627
Fertilizer employment *i*	90.2	91.5	96.7	103.3	96.8	98.4
Fertilizer payrolls *i*	74.3	75.9	82.4	101.3	85.8	86.3
Value imports, fert. and mat. *d*	......	......	$1,311	$2.536	$1,425	$1,814
GENERAL:						
Acceptances outst'd'g *f*	$196	$222	$186	$221	$176	$215
Coal prod., anthracite, tons	......	......	......	4,557,000	4,053,000	4,840,000
Coal prod., bituminous, tons	......	......	......	41,574.000	38,413,000	38,465,000
Com. paper outst'd'g *f*	$231	$214	$252	$205	$250	$209
Failures, Dun & Bradstreet	1,024	1,184	1,111	1.234	976	1,043
Factory payrolls *i*	114.7	101.7	114.5	101.3	109.4	93.8
Factory employment *i*	110.7	103.9	110.0	103.3	107.2	100.2
Merchandise imports *d*	......	......	$207,141	$215,289	$194,928	$181,461
Merchandise exports *d*	......	......	$343,485	$331,978	$295,245	$288,573
GENERAL MANUFACTURING:						
Automotive production	487,352	351,785	493,222	313,392	269,108	188,757
Boot and shoe prod., pairs	......	......	36,565,529	37,272,864	34,991,706	36,806,764
Bldg. contracts, Dodge *j*	$380,347	$299,847	$383,069	$261,796	$347,651	$323,227
Newsprint prod., U. S. tons	85,338	78,886	88,192	78,591	77,888	77,309
Newsprint prod., Canada, tons.	282,344	288,726	309,957	280,985	282,322	253,230
Glass containers, gross‡	......	......	......	4,891	4,289	4,250
Plate glass prod., sq. ft.	16,059,294	15,812,000	17,070,300	18,368,900	14,090,796	13,662,855
Window glass prod., boxes	1,264,057	1,142,570	1,348,895	1,121,288	1,001,979	913,980
Steel ingot prod., tons	......	......	6,461,898	6,147,783	5,895,232	4,769,468
% steel capacity	......	......	96.10	89.75	90.75	72.87
Pig iron prod., tons	......	......	4,445,961	4,062,901	4,176,527	2,878,556
U.S. cons'pt. crude rub., lg. tons	54,652	55,677	56,477	57,155	50,206	51,402
Tire shipments	......	......	5,560,709	5,160,661	4,511,664	5,658,126
Tire production	......	......	5,081,939	5,391,815	4,416,587	5,076,280
Tire inventories	......	......	9,447,962	8,381,852	9,886,022	8,080,462
Cotton consumpt., bales	......	......	770,702	686,451	639,252	624,183
Cotton spindles oper.	22,685,968	22,784,776	22,456,588	22,658,994	22,278,204	22,231,496
Silk deliveries, bales	36,374	32,241	39,877	41,858	28.828	36,869
Wool consumption *z*	......	......	45.9	39.2	38.3	36.0
Rayon deliv., lbs.	35,000,000	33,300,000	36,900,000	34,800,000	30,900,000	32,800,000
Rayon employment *i*	314.5	313.4	311.1	310.8	311.9	300.2
Rayon payrolls *i*	331.4	310.4	322.6	303.4	324.4	286.4
Soap employment *i*	84.3	88.6	88.9	90.4	82.4	88.5
Soap payrolls *i*	99.7	104.4	107.2	109.0	107.1	107.1
Paper and pulp employment *i*	115.8	115.2	115.1	113.6	116.5	108.8
Paper and pulp payrolls *i*	123.7	124.6	123.8	125.6	123.7	113.4
Leather employment *i*	84.0	87.9	81.6	88.4	79.8	86.5
Leather payrolls *i*	83.1	87.2	81.6	88.2	76.8	84.2
Glass employment *i*	117.0	109.3	113.2	106.2	109.1	100.9
Glass payrolls *i*	131.0	121.0	129.8	121.2	119.7	105.0
Rubber prod. employment *i*	94.7	93.9	92.8	92.4	89.7	86.0
Rubber prod. payrolls *i*	102.7	99.8	99.4	101.9	96.0	91.0
Dyeing and fin. employment *i*	131.2	134.2	128.3	132.9	124.9	125.0
Dyeing and fin. payrolls *i*	113.0	115.2	111.3	115.5	106.5	107.7
MISCELLANEOUS:						
Oils & Fats Index (26=100)[1]	......	......	48.7	62.5	49.3	67.0
Gasoline prod. *p*	......	......	52,907	55,161	52,313	51,890
Cottonseed oil consumpt., bbls.	......	......	315.764	358.122	276,731	444,743
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	......	......	39,179,174	35,827,911	35,327,356	38,579,427
Trade sales (580 establishments)	......	......	19,638,441	18,466,640	18,416,711	21,413,297
Industrial sales, total	......	......	15,953.121	14,007,459	13,458,969	13,381,467
Paint & Varnish, employ. *i*	126.0	125.1	125.1	125.1	126.2	122.1
Paint & Varnish, payrolls *i*	136.2	131.5	135.8	134.7	134.5	127.5

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100, adjusted to 1937 census totals; *j* 000 omitted, 37 states; *p* Thousands of barrels, 42 gallons each; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *t* 387 identical manufacturers, Bureau of the Census, quantity expressed in dozen pairs; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce; *z* Units are millions of lbs.; ‡ 000 omitted; * New series beginning March, 1940:

[1] Revised series beginning February, 1940.

Texas Gulf Sulphur Earnings Up 60 per cent.

Texas Gulf Sulphur Co., Inc. reports for quarter ended September 30, 1940, net profit of $2,757,763 after depreciation, amortization, federal income taxes under second revenue act of 1940, etc., equal to 72 cents a share on 3,840,000 no-par shares of capital stock.

This compares with $1,749,469 or 45 cents a share in September quarter of previous year and $2,455,965 or 64 cents a share for quarter ended June 30, 1940.

It is not yet known whether or not there will be any excess profits tax payable on earnings for 1940, the company reports.

For nine months ended September 30, last, indicated net profit (as compiled from company's quarterly reports) was $7,258, 736 equal to $1.89 a share, comparing with $5,014,295 or $1.30 a share in first nine months of 1939.

New Jersey Zinc Earnings Increase

New Jersey Zinc Co. reports for quarter ended September 30, 1940, net profit of $1,796,195 after federal income taxes, depreciation, depletion, contingencies etc., equal to 91 cents a share on 1,963,264 shares of capital stock.

This compares with $1,460,290 or 74 cents a share in September quarter of previous year, and $1,553,156 or 79 cents a share for quarter ended June 30, 1940.

For nine months ended September 30, last, net profit was $5,114,464 equal to $2.60 a share, comparing with $3,507,939 or $1.78 a share in first months of 1939.

Atlas Powder Earns $3.48 a Share

Report of Atlas Powder Co. and subsidiaries for nine months ended September 30, 1940, shows net profit of $1,127,261 after depreciation, federal income taxes at new rates, etc., equivalent after preferred dividends paid, to $3.48 a share on 250,189 no-par shares of common stock, excluding shares held by company.

This compares with $831,842 or $2.31 a share on 249,164 common shares in first nine months of 1939.

For quarter ended September 30, last indicated net profit (based on a comparison of company's reports for six and nine months periods) was $382,743, equal to $1.19 a share on common, comparing with $381,929 or $1.19 a common share in September quarter of previous year and net profit of $379,822 or $1.17 a common share reported for quarter ended June 30, 1940.

Air Reduction Earnings Total $1,695,373

Report of Air Reduction Co., Inc. and wholly-owned subsidiaries for quarter ended September 30, 1940, subject to audit, shows net profit of $1,695,373 after depreciation, federal income taxes, etc., equal to 62 cents a share on 2,711,137 shares of capital stock.

This compares with $1,291,816 or 50 cents a share on 2,563,992 shares in September quarter of previous year and $1,663,106 or 61 cents a share on 2,711,491 shares reported for quarter ended June 30, 1940.

For nine months ended September 30, last, indicated net profit (as compiled from company's quarterly reports) was $4,801, 469 equal to $1.76 a share, comparing with $3,524,411 or $1.37 a share in first nine months of 1939.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Abbott Laboratories 4½% pf. q.	$1.125	Jan. 2	Jan. 15
Air Reduction Co., Inc., q.	.25	Dec. 31	Jan. 15
Extra	.25	Dec. 31	Jan. 15
Amer. Cyanamid Co., Class A & B, q.	.15	Dec. 12	Jan. 2
5% Cum. Conv. pf., 1st & 2nd series, q.	.125	Dec. 12	Jan. 2
Celanese Corp. of Am. 7% Cum. prior pf., q.	1.75	Dec. 17	Jan. 1
7% Cum. 1st part pf., (S.A.)	3.50	Dec. 17	Dec. 31
Chemical Foundation, Inc.	.14	Dec. 31	Jan. 15
Colgate-Palmolive-Peet Co., pf., q.	1.0625	Dec. 6	Dec. 31
Commercial Alcohols, Ltd., pf., q.	.10	Dec. 31	Jan. 15
Corn Products Refining, q.	.75	Jan. 3	Jan. 15
Pf., q.	1.75	Jan. 3	Jan. 15
Dow Chemical Co. q.	.75	Feb. 1	Feb. 15
Pf., q.	1.25	Feb. 1	Feb. 15
du Pont (E. I.) de Nemours & Co., $4.50 pf., q.	1.50	Dec. 15	Jan. 2
Hercules Powder Co., pf., q.	1.50	Feb. 3	Feb. 14
Koppers Co. pf., q.	1.50	Dec. 21	Jan. 2
Merck & Co., pf. q.	1.50	Dec. 17	Jan. 1
Monroe Chemical Co. pf., q.	.875	Dec. 14	Jan. 2
Monsanto Chem. Co. $4.25 pf. A (S.A.)	2.25	May 10	June 2
$4.25 pf. B. (S.A.)	2.25	May 10	June 2
National Oil Products	.50	Jan. 16	Jan. 20
Parke, Davis & Co.	.40	Dec. 17	Jan. 2
Procter & Gamble Co. pf., q.	2.00	Dec. 24	Jan. 15
U. S. Smelting & Refining & Mining Co., common	1.00	Dec. 12	Jan. 15
Pf., q.	.875	Dec. 27	Jan. 15
Union Carbide & Carbon Corp.	.75	Dec. 6	Jan. 1
U. S. Potash Co., common	.25	Dec. 14	Dec. 31

Earnings Statements Summarized

Company:	Annual dividends	Net income 1940	Net income 1939	Common share earnings 1940	Common share earnings 1939	Surplus after dividends 1940	Surplus after dividends 1939
Armour & Co. of Illinois:							
53 weeks, Nov. 2	*f* ...	$8,307,429	*aa*$7,012,057	$.26	*s*$1.99	......	......
Canadian Industrial Alcohol Co., Ltd.:							
Year, August 31	*y* .15	220,112	212,348	.20	.19	......	......
Masonite Corp.:							
16 weeks, Dec. 21	*y* 1.50	343,257	441,059	.58	.77	......	......
Portland Gas & Coke Co.:							
12 months, Nov. 30	...	231,312	229,575	...	...	......	......
Texas & Pacific Rwy.:							
11 months, Nov. 30	*f* ...	1,364,091	809,359	.72	*p*3.41	......	......
U. S. Plywood Corp.:							
6 months, Oct. 31	*y* 1.20	330,914	276,162	*h*1.39	*h*1.28	......	......
U. S. Smelting, Refining & Mining Co.:							
10 months, Oct. 31	6.00	4,568,499	4,250,625	6.06	5.46	......	......
Vick Chmical Co.:							
Sept. 30 quarter	*y* 3.00	1,044,247	1,071,939	1.52	1.53	......	......

a On Class A shares; *b* On Class B shares; *c* On Combined Class A and Class B shares; *d* Deficit. *f* No common dividend; *j* On average number of shares; *k* For the year 1940; *p* On preferred stock; On Class A shares; *y* Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; ‡ Indicated quarterly earnings as shown by comparison of company's reports for the 6 and 9 months periods; § Plus extras; *n* Preliminary statement; *h* On shares outstanding at close of respective periods. ** Indicated quarterly earnings as shown by comparison of company's reports for 1st quarter of fiscal year and the six months period. ‡‡ Indicated earnings as compiled from quarterly reports. † Net loss. * Not available. ¶¶ Before interest on income notes. *x* paid on or declared in last 12 months plus extra stock.

Price Trend of Representative Chemical Company Stocks

	Nov. 30	Dec. 7	Dec. 14	Dec. 21	Net gain or loss last mo.	Price on Dec. 23, 1939	1940 High	1940 Low
Air Reduction Co.	42¼	40⅝	42¾	40⅛	—1⅞	54⅜	58⅛	36½
Allied Chemical & Dye	167¼	170	166	162½	—5¼	176	182	135½
Amer. Agric. Chem.	16¼	16	16¼	15¼	—1	21¾	21	12⅛
American Cyanamid "B"	35½	34½	35⅜	35⅜	—⅛	33¼	39⅞	26
Columbian Carbon	75	75½	75⅞	74⅞	—⅛	92	98¾	71
Commercial Solvents	10½	10¼	10⅞	10⅝	+⅛	13¼	16⅝	8
Dow Chemical Co.	130⅛	133½	135	136	+5⅞	139¾	171	127¼
du Pont de Nemours	157¼	163	164⅞	162	+4¾	179	189¼	146½
Hercules Powder	73	72½	70⅞	71	—2	89	100½	69¼
Mathieson Alkali	28¾	28⅜	28⅝	26½	—2¼	30⅞	32¾	21
Monsanto Chem. Co.	81⅞	80	81⅞	81⅛	—¾	107	119	79
Standard Oil of N. J.	34⅜	33¾	33⅝	33¾	—⅝	44½	46½	29⅞
Texas Gulf Sulphur	36¼	36¼	37½	36¾	+½	32¾	37¼	26⅞
Union Carbide & Carbon	71¾	71	71⅞	68	—3¾	87½	88⅜	59⅞
U. S. Industrial Alcohol	21½	21⅜	23	23¾	+2¼	24⅛	28	14

Chemical Finances December, 1940—p. 72

Chemical Finances
December, 1940—p. 73

Chemical Stocks and Bonds

Dec. 1940 Last	Dec. 1940 High	Dec. 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales (Number of shares) Dec. 1940	Sales (Number of shares) 1940	Stocks	Par $	Shares Listed	Dividends* 1940	Earnings** $-per-share-$ 1939	1938	1937
NEW YORK STOCK EXCHANGE															
53	70¼	49¼	71½	53	61	46¾	4,800	56,000	Abbott Labs.	No	752,468	2.15	2.61	2.43	2.51
40⅝	58⅛	36½	68	45¾	67⅞	40	35,300	378,100	Air Reduction	No	2,563,992	1.75	1.98	1.47	2.86
161½	182	135½	200½	151½	197	124	9,200	136,800	Allied Chem & Dye	No	2,214,099	6.00	9.50	5.92	11.19
16½	21	12⅛	24½	16	28½	22	9,300	57,500	Amer. Agric. Chem	No	627,987	1.20	1.22	2.28	2.95
5⅜	8¼	4⅛	11⅞	5⅛	15	9	13,200	72,100	Amer. Com. Alcohol	No	280,934	...	—.40	—2.05	3.23
28⅛	35½	23	37	21	31½	20	1,100	23,300	Archer-Dan.-Midland	No	545,416	1.40	3.02	.43	5.08
68	80½	57	71	50	68	36	2,200	22,400	Atlas Powder Co.	No	250,288	4.25	3.82	2.09	4.40
116½	124¾	112½	127	116	126¼	105	150	3,600	5% conv. cum. pfd.	100	68,597	5.00	18.94	14.77	20.90
27¼	35½	20	30¼	13⅝	26⅝	9	12,200	705,100	Celanese Corp. Amer.	No	1,000,000	1.25	3.53	.30	2.04
120¼	121	105½	109⅞	84	96	82	3,180	33,980	prior pfd	100	164,818	7.00	37.72	15.05	27.07
11⅞	20	10⅛	18	11⅛	17	7¼	28,400	456,100	Colgate-Palm.-Peet	No	1,962,087	1.00	2.74	1.77	—.35
76⅛	98¾	71	96	73	98½	53¾	3,500	32,000	Columbian Carbon	No	537,406	4.60	5.32	5.13	8.31
10⅞	16⅝	8	16	8⅝	12¾	5⅞	40,200	897,600	Commercial Solvents	No	2,636,878	.25	.61	—.11	.60
45¾	65⅛	40¼	67½	54⅞	70⅝	53	51,400	249,900	Corn Products	25	2,530,000	3.00	3.32	3.18	2.52
179	184	165	177	150	177	162	1,120	7,600	7% cum. pfd.	100	245,738	7.00	41.18	30.60	32.96
14½	23¼	12½	32⅝	18	40⅞	25	5,850	30,470	Devoe & Rayn. A.	No	95,000	.25	2.05	—1.73	4.05
140	171	127¼	144⅝	101½	141	87⅞	6,300	131,200	Dow Chemical	No	1,034,983	3.00	3.76	3.91	4.15
163½	189¼	146½	188½	126¼	154⅝	90½	28,800	415,700	DuPont de Nemours	20	11,065,762	7.00	7.70	3.74	7.37
125	129⅜	114	124⅛	112	120½	109½	5,600	55,650	4½% pfd.	No	1,688,850	4.50	52.25	67.27	165.48
139	166¾	117	186⅛	138⅛	187	121½	13,400	179,900	Eastman Kodak	No	2,476,013	6.00	8.55	7.54	9.76
180	180	155	183½	155½	173	157	40	1,900	6% cum.	100	61,657	6.00	349.31	261.22	362.45
38	39¼	24¾	36	18¼	32	19⅞	12,800	209,300	Freeport Sulphur	10	796,380	2.00	2.76	1.87	3.36
6⅜	10	5½	10⅞	7	12⅛	6¾	8,400	56,000	Gen. Printing Ink	1	735,960	.60	.94	.02	1.32
13⅞	19¾	11	24½	14	28½	13	17,900	120,000	Glidden Co.	No	829,989	1.00	1.70	—.29	2.62
45	45	30	47	34	51½	37	1,200	10,700	4½% cum. pfd.	50	199,940	2.25	4.27	1.08	12.72
91⅞	113¼	89⅞	112¾	93	111	76¾	2,300	20,200	Hazel Atlas	25	434,409	5.00	6.64	4.97	6.67
70	100½	69	101½	63	87	42⅜	9,500	96,800	Hercules Powder	No	1,316,710	2.85	3.65	1.95	2.97
127	133½	126¼	135½	128½	135¼	126⅝	310	4,030	6% cum. pfd.	100	96,194	6.00	60.87	85.31	50.75
23⅝	29	16⅜	29½	16⅝	30⅝	14⅝	4,400	41,500	Industrial Rayon	No	759,325	2.00	1.77	.34	.34
23⅞	47⅜	21¼	46¼	17½	34½	15	4,100	56,600	Interchem.	No	290,320	1.60	4.10	.32	1.44
111½	113	91	109½	90	98	80	530	6,220	6% pfd.	100	65,661	6.00	24.27	7.30	12.26
2⅛	2½	1	3⅝	1⅛	3⅞	2	10,200	63,900	Intern. Agricul.	No	436,048	...	—1.32	—0.003	.16
40¼	44	18⅛	41	16	39	15	5,900	23,600	7% cum. pfd.	100	100,000	...	1.26	7.01	7.70
24¼	38⅞	19⅜	55⅝	35	57⅞	36⅞	155,200	1,165,500	Intern. Nickel	No	14,584,025	2.00	2.39	2.09	3.31
39	39⅝	26⅞	38	29	30¼	19½	2,600	16,700	Intern. Salt	No	240,000	2.50	1.92	2.29	2.11
20	23¾	14⅜	22½	14½	24	19⅛	1,500	17,200	Kellogg (Spencer)	No	509,213	1.60	1.39	.71	2.81
44⅛	53⅜	30	56⅝	36½	58⅝	23¼	18,200	216,900	Libbey Owens Ford	No	2,513,258	3.50	3.21	1.57	4.19
15⅞	18⅜	10⅛	19	13½	21½	12⅛	12,100	99,500	Liquid Carbonic	No	700,000	1.00	1.62	1.81	2.37
27½	32⅜	21	37⅝	20⅝	36⅞	19⅝	5,300	100,400	Mathieson Alkali	No	828,171	1.50	1.12	1.01	1.81
85¾	119	79	114⅝	85⅝	110	67	17,000	151,500	Monsanto Chem.	No	1,241,816	3.00	4.01	3.35	4.40
116	119	110	121	110	117½	111	340	3,860	4½% pfd. A.	No	50,000	4.50	54.29	81.51	49.99
121	122	113½	122½	112	...	...	200	3,350	4½% pfd. B.	No	50,000	4.50	54.29	81.51	49.99
17½	22½	14⅛	27½	17⅝	31	17⅛	40,500	344,300	National Lead	10	3,095,100	.87	1.28	.75	.95
175	176	160	173⅛	152	178½	154	300	5,900	7% cum. "A" pfd.	100	213,793	7.00	27.04	20.03	22.86
150½	153¾	132	145	133	145½	127	420	4,540	6% cum "B" pfd.	100	103,277	6.00	55.30	35.97	43.77
30⅛	44	28¾	46	28½	38	15	......	8,200	National Oil Products	4	179,829	1.35	3.89	2.23	2.53
8	14¼	6⅛	17⅞	8⅛	19½	9⅞	13,100	232,400	Newport Industries	1	620,459	.30	.66	—.08	2.27
46¾	64⅝	42	70	50	76¼	40	36,200	186,500	Owens-Illinois Glass	12.50	2,661,204	2.00	3.17	2.08	3.51
57⅞	71¾	53	66	50⅝	59	39½	16,900	230,900	Procter & Gamble	No	6,325,087	2.75	3.80	2.80	4.05
118½	118½	112½	119⅝	112	122¼	114	570	9,040	5% pfd.	100	169,517	5.00	298.55	101.81	157.06
11¾	13⅛	7⅝	17¼	9⅞	18⅝	10	18,200	195,400	Shell Union Oil	No	13,070,625	.75	.77	.79	1.44
105⅛	108¼	95⅛	107⅞	98½	106½	93	1,700	17,500	5½ cum. pfd.	100	341,000	5.50	34.61	30.18	60.59
21⅛	23¼	12¼	29½	15½	34⅝	18½	7,500	83,800	Skelly Oil	No	995,349	1.25	1.99	2.27	6.07
26¼	29	20⅜	30	22⅝	35½	24⅝	98,500	683,600	S. O. Indiana	25	15,272,020	1.50	2.24	1.82	3.10
34⅝	46½	29⅞	53½	38	58⅝	39⅝	199,100	1,313,100	S. O. New Jersey	25	26,618,065	1.75	3.27	2.80	5.04
8½	9¼	4¼	9½	4	8	3⅞	17,200	135,900	Tenn. Corp.	5	853,696	.25	.41	.46	1.09
40	47⅝	33	50⅝	32½	49⅝	37⅝	82,100	813,432	Texas Corp.	25	10,876,882	2.00	3.02	2.13	5.02
36¾	37¼	26⅞	38½	26	38	26	20,800	215,000	Texas Gulf Sulphur	No	3,840,000	2.50	2.04	1.81	3.02
69⅝	88⅜	59⅞	94¼	65½	90⅞	57	57,400	523,400	Union Carbide & Carbon	No	9,277,288	2.30	3.86	2.77	4.81
47¾	65⅝	42½	69½	52	73½	39	5,300	37,000	United Carbon	No	397,885	3.00	3.81	3.78	5.91
23¾	28	14	29⅝	13½	30¼	13½	5,500	122,800	U. S. Indus. Alcohol	No	391,238	...	.20	—1.08	1.24
34⅜	43⅞	25	40	16	28⅞	11½	14,700	586,200	Vanadium Corp. Amer.	No	377,140	1.50	3.25	.01	2.22
23⅜	31½	19	29⅝	18¼	25¼	13½	3,000	31,900	Victor Chem.	5	696,000	1.40	1.59	1.05	1.01
2¼	4⅛	1¾	5⅝	2½	5⅝	2⅝	47,000	66,400	Virginia-Caro. Chem.	No	486,122	...	—1.57	—1.80	—.05
25½	31¾	14	33⅝	17	32½	15¾	5,800	56,600	6% cum. part. pfd.	100	213,052	...	2.41	1.90	5.88
36¼	38½	27¾	39¼	15¼	20½	10	2,300	51,700	Westvaco Chlorine	No	339,362	1.85	2.81	1.52	1.46
109⅞	109⅞	108	39½	20	31½	20	1,330	1,330	cum. pfd.	No	60,000	4.50	...	...	...
NEW YORK STOCK EXCHANGE															
37¾	39⅞	26	35⅝	18⅝	30¼	15½	30,400	582,900	Amer. Cyanamid "B"	10	2,618,387	1.10	2.07	.91	2.09
132¾	134⅞	98	112⅝	76	92	50	1,425	25,250	Celanese. 7% cum. 1st pfd.	100	148,179	9.72	34.17	8.95	22.32
4⅝	6¾	2⅜	6⅝	3	6⅝	3	1,100	18,700	Celluloid Corp.	15	194,952	...	—.70	—2.73	—.92
2	7¾	2	7⅝	4½	12	6⅛	600	1,700	Courtauld's Ltd.	£1	24,000,000	.16	4.92%	.30%	5.64%
7½	8⅛	5	9¼	5	9⅞	6	400	19,800	Duval Texas Sulphur	No	500,000	.75	1.25	.71	.43
76½	92	60	68	30	41¼	27	425	16,725	Heyden Chem. Corp.	100	125,497	3.00	5.98	2.07	3.94
91¼	104	65	117	90	115½	55	8,200	70,100	Pittsburgh Plate Glass	25	2,192,824	5.00	4.94	3.00	8.53
77⅞	100	62½	113½	81	117⅝	66	9,050	56,050	Sherwin Williams	25	638,927	3.00	5.96	2.43	8.78
109½	114¾	106	116	106½	114⅛	107	340	3,430	5% cum. pfd.	50	132,189	5.00	35.08	8.78	45.50
PHILADELPHIA STOCK EXCHANGE															
179	192	158¾	179	135	167	121½	325	4,275	Pennsylvania Salt	50	150,000	9.00	10.52	6.29	11.79

Dec. 1940 Last	Dec. 1940 High	Dec. 1940 Low	1939 High	1939 Low	1938 High	1938 Low	Sales Dec. 1940	Sales 1940	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE													
104	105¼	100⅛	103⅜	98	105⅝	99¼	130,000	2,368,000	Amer. I. G. Chem. Conv.	1949	5½	M-N	$22,400,000
31½	41	27½	41½	19	38	25⅛	108,000	1,082,000	Anglo Chilean Nitrate inc. deb.	1967	4½	J	10,400,000
28	39¾	27	37	21⅛	35⅝	24⅜	22,000	1,573,000	Lautaro Nitrate inc. deb.	1975	4	J-D	27,200,000
38	40	21	30	16	35⅝	24⅜	1,000	11,000	Ruhr Chem.	1948	6	A-O	1,500,000
99⅝	100¼	93½	95⅝	88⅝	...	...	611,000	7,937,000	Shell Union Oil	1954	2½	J-J	85,000,000
106½	107	101⅛	106¼	97⅞	105⅝	100	130,000	2,797,000	Standard Oil Co. (New Jersey) deb.	1961	3	J-D	85,000,000
105⅝	107	100⅝	106½	94¼	103	98	119,000	2,693,000	Standard Oil Co. (New Jersey) deb.	1953	2¾	J-J	50,000,000
106½	108¼	102	105⅞	95¼	...	...	108,000	3,143,000	Texas Corp.	1959	3	A-O	40,000,000

* Including extras paid in cash.
** For either fiscal or calendar year.

Calendar of Events

January *

Jan. 1. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Jan. 2. Indianapolis Paint, Varnish & Lacquer Assoc., Columbia Club, Indianapolis, Ind.
Jan. 7. Toledo Paint, Varnish & Lacquer Assoc., Meeting, Noon, Elks Club.
Jan. 10. Society of Chemical Industry, American Section, Perkin Medal Meeting, Chemists' Club, New York City.
Jan. 13. American Chemical Society, North Jersey Section Regular Meeting, Essex House, Newark, N. J.
Jan. 13. American Institute of Consulting Engineers, Annual Dinner Meeting, University Club, New York City.
Jan. 13-16. Refrigeration Service Engineers Society, 7th Annual Convention, Stevens Hotel, Chicago, Ill.
Jan. 15-17. American Society of Civil Engineers, Annual Meeting, New York City.
Jan. 16. Louisville Paint & Varnish Production Club, Louisville, Ky.
Jan. 16. Salesman's Association of the American Chemical Industry, Installation of Officers, and Luncheon Meeting.
Jan. 16. New England Paint & Varnish Broduction Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Jan. 16-17. Eastern Section, Liquefied Petroleum Gas Ass'n., Park Central Hotel, New York City.
Jan. 16-17. International Association of Electrical Inspectors (Kentucky Chapter), Brown Hotel, Louisville, Ky.
Jan. 17. Cleveland Paint & Varnish Production Club, Regular Monthly Meeting, Stouffers Restaurant.
Jan. 17. American Institute of Chemists, Dr. Marston T. Bogert on "The Rôle of The Chemist in National Defense," The Chemists' Club, New York City.
Jan. 17. Milwaukee Paint, Varnish & Lacquer Ass'n. Regular Meeting, Milwaukee Athletic Club.
Jan. 17-18. New York State Sewage Works Ass'n., Annual Convention, New York City.
Jan. 20-21. Compressed Gas Manufacturers' Ass'n., Inc., Annual Meeting, Waldorf-Astoria Hotel, New York City.
Jan. 21. Oil Trades Ass'n. of New York, Inc., Banquet, Quarterly Meeting, Waldorf-Astoria Hotel, New York City.
Jan. 21. Toledo Paint, Varnish & Lacquer Ass'n., Dinner Meeting, Noon, Elks Club.
Jan. 22-23. American Management Ass'n. (Finance Conference), Hotel Roosevelt, New York City.
Jan. 23-24. International Ass'n. of Electrical Inspectors (Illinois Chapter), Chicago, Ill.
Jan. 24. Akron Rubber Group, Dinner and Meeting, Akron City Club, Akron, O.
Jan. 25. American Electroplaters' Society, Chicago Branch Annual Meeting, The Palmer House, Chicago, Ill.
Jan. 27. American Chemical Society, Western Connecticut Section, Hubbard Heights Golf Club, Stamford, Conn.
Jan. 30. Pacific Coast Section, Liquefied Petroleum Gas Ass'n., Clark Hotel, Stockton, Calif.

February

Feb. 3-4. International Association of Electrical Inspectors (Missouri-Kansas Chapter), Kansas City, Mo.
Feb. 4. Los Angeles Paint, Varnish & Lacquer Ass'n., Regular Meeting, Mayfair Hotel.
Feb. 5. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Feb. 6. Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
Feb. 7-8. International Association of Electrical Inspectors (Georgia Chapter), Columbus, Ga.
Feb. 12. The American Ceramic Society, Joint Meeting, Pittsburgh Section and Art Division, American Ceramic Society, Pittsburgh, Pa.
Feb. 12. Gypsum Ass'n., Annual Meeting, Palmer House, Chicago, Ill.
Feb. 12-14. American Management Ass'n. (Personnel Conference), Palmer House, Chicago, Ill.
Feb. 13. Golden Gate Paint, Varnish & Lacquer Ass'n., Joint Meeting with Purchasing Agents' Ass'n. of Northern Calif., Palace Hotel, San Francisco, Calif.
Feb. 17-18. American Gas Ass'n., Midwest Regional Gas Sales Conference, Chicago, Ill.
Feb. 17-20. Technical Ass'n., Pulp and Paper Industry, Annual Meeting, Roosevelt Hotel, New York City.
Feb. 17-20. American Institute of Mining & Metallurgical Engineers, Inc., Annual Meeting, Engineering Societies Bldg., Hotel Commodore, New York City.
Feb. 17-21. American Paper and Pulp Association, Annual Convention, The Waldorf-Astoria, New York City.
Feb. 17-21. National Electrical Manufacturers' Ass'n. (Mid-Winter Conference), Palmer House, Chicago, Ill.
Feb. 19. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Feb. 20. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Feb. 21. American Institute of Chemists, The Chemists' Club, New York City.
Feb. 21. Cleveland Paint & Varnish Production Club, Regular Monthly Meeting, Stouffers Restaurant.
Feb. 22. Cincinnati Paint, Varnish & Lacquer Ass'n., Ladies Night, Hall of Mirrors, Netherland Plaza Hotel, Cincinnati, O.
Feb. 24-25. International Ass'n. of Electrical Inspectors (St. Louis Chapter), St. Louis, Mo.
Feb. 24-25. Liquefied Petroleum Gas Ass'n., Inc., Annual Convention and Exhibit of Appliances and Equipment, Palmer House, Chicago, Ill.
Feb. 26-28. Iowa Independent Oil Jobbers' Ass'n., Des Moines, Iowa.
Feb. 27. Chicago Drug & Chemical Ass'n., Noonday Luncheon Meeting, Morrison Hotel, Chicago, Ill.
Feb. 28. Society of Chemical Industry, American Section, Meeting on subject, "Surface Active Agents," Chemists' Club, New York City.

March

Mar. 3-7. American Society for Testing Materials, Spring Meeting, Hotel Mayflower, Washington, D. C.
Mar. 5. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Mar. 6. Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
Mar. 7. Society of Chemical Industry, Joint Meeting with American Chemical Society, Presentation of Nichols Medal by American Chemical Society.
Mar. 13. 16th Annual Drug, Chemical and Allied Trades Banquet, Waldorf-Astoria Hotel, New York City.
Mar. 13. Chicago Paint, Varnish & Lacquer Ass'n., Regular Meeting and Dinner.
Mar. 13. Drug, Chemical & Allied Trades Section of the New York Board of Trade, 16th Annual Drug, Chemical & Allied Trades Banquet, Waldorf-Astoria Hotel, New York City.
Mar. 13-14. American Gas Ass'n., Industrial Gas Sales Conference, Baltimore, Md.
Mar. 20. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Mar. 20. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Mar. 20-21. American Water Works Ass'n., New York Section Meeting, Syracuse, N. Y.
Mar. 20-21. New Jersey Sewage Works Ass'n., Annual Meeting, Stacy-Trent, Trenton, N. J.
Mar. 21. Akron Rubber Group, Dinner & Meeting, Akron City Club, Akron, O.
Mar. 21. Milwaukee Paint, Varnish & Lacquer Ass'n., Regular Meeting, Milwaukee Athletic Club.
Mar. 25. Oil Trades Ass'n. of New York, Inc., Banquet, Election of Officers, Waldorf-Astoria Hotel, New York City.
Mar. 30-Apr. 5. The American Ceramic Society, 43rd Annual Meeting, Lord Baltimore Hotel, Baltimore, Md.
Mar. 31-Apr. 1. Tanners' Council of America, Official Opening of American Leathers, Waldorf-Astoria Hotel, New York City.
Mar. 31-Apr. 1. Tanners' Council of America, Leather Show, Waldorf-Astoria Hotel, New York City.

April

Apr. 1. Packaging Institute, Semi-Annual Meeting, Stevens Hotel, Chicago, Ill.
Apr. 1-3. The American Society of Mechanical Engineers, Spring Meeting, Atlanta, Ga.
Apr. 1-4. American Management Ass'n. (Packaging Conference & Exposition), Stevens Hotel, Chicago, Ill.
Apr. 2. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Apr. 3. Indianapois Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.

* **Each month we publish a Calendar of Events covering the several months immediately following. Secretaries of associations, societies or other groups are urged to cooperate by sending complete data to us. We will be glad, of course, to give by letter or by phone any information we may be able to compile regarding these dates.**

Calendar of Events, 1941 — P. 4

Apr. 7-11. American Chemical Society, Semi-Annual Meeting, St. Louis, Mo.
Apr. 9-10. Midwest Power Conference, Palmer House, Chicago, Ill.
Apr. 16-19. The Electrochemical Society, Inc., Semi-Annual Convention, Cleveland, O.
Apr. 17. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Apr. 17. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Apr. 18. Society of Chemical Industry, Joint Meeting with American Chemical Society, New York Section.
Apr. 21-23. American Gas Ass'n., Distribution Conference, Pittsburgh, Pa.
Apr. 21-23. National Sanitary Supply Ass'n., Annual Convention, St. Louis, Mo.
Apr. 21-24. 37th Annual Knitting Arts Exhibition, Commercial Museum, Philadelphia, Pa.
Apr. 23-25. American Society of Civil Engineers, Spring Meeting, Baltimore, Md.
Apr. 23-25. Missouri Ass'n. of Public Utilities, Excelsior Springs, Mo.
Apr. 24-25. American Gas Ass'n., Hotel, Restaurant and Commercial Sales Conference, Chicago, Ill.
Apr. 24-25. National Petroleum Ass'n., Semi-Annual Meeting, Hotel Cleveland, Cleveland, O.
Apr. 28-May 1. Chamber of Commerce of the U. S., Washington, D. C.

May

May 1. Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
May 5-7. American Gear Manufacturers' Ass'n. (25th Annual Meeting), The Homestead, Hot Springs, Va.
May 5-8. American Drug Manufacturers' Association, Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.
May 5-8. American Gas Ass'n., Natural Gas Section Convention, Adolphus and Baker Hotels, Dallas, Tex.
May 5-8. Society of Motion Picture Engineers, Rochester, N. Y.
May 7. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
May 7-9. Electrical Manufacturers' Club, The Homestead, Hot Springs, Va.
May 8-9. National Metal Trades Ass'n., Palmer House, Chicago, Ill.
May 8-9. Tanners' Council of America, Spring Meeting, White Sulphur Spring, W. Va.
May 9. New York Section, American Chemical Society, Annual Meeting.
May 11-13. Indiana Independent Petroleum Ass'n., Spring Convention and Refiners' and Suppliers' Exhibit, Hotel Severin, Ind.
May 11-15. National Electrical Manufacturers' Ass'n. (Spring Conference), The Homestead, Hot Spring, Va.
May 12-14. Scientific Apparatus Makers of America, Annual Meeting, White Sulphur Springs.
May 15. Chicago Paint, Varnish & Lacquer Ass'n., Annual Meeting and Dinner.
May 15. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
May 18-22. National Electrical Wholesalers' Ass'n., The Homestead, Hot Springs, Va.
May 19-21. American Gas Ass'n., Production and Chemical Conference, New York City.
May 19-21. American Institute of Chemical Engineers, 33rd Semi-Annual Meeting, Edgewater Beach Hotel, Chicago, Ill.
May 19-23. American Ass'n. of Cereal Chemists, 1941 Convention, Fontenelle Hotel, Omaha, Neb.
May 19-23. American Society for Metals, Western Metal Congress, Western Metal Exposition, Los Angeles, Calif.
May 19-23. American Petroleum Institute, 11th Mid-Year Meeting, Tulsa, Okla.
May 23-27. Westinghouse Agent-Jobbers' Ass'n., The Homestead, Hot Springs, Va.
May 26-29. National Ass'n. of Purchasing Agents, 26th Annual International Convention, Stevens Hotel, Chicago, Ill.
May 27-29. The American Society of Refrigerating Engineers, 28th Spring Meeting, Hotel Gibson, Cincinnati, O.

June

June 4-6. Synthetic Organic Chemical Manufacturers' Ass'n., June Outing, Sky Top Lodge, Pa.
June 5. Indianapolis Paint, Varnish & Lacquer Ass'n., Meeting with Golf, Country Club, Indianapolis, Ind.
June 7. New York Section, American Chemical Society, Annual Outing.
June 9-10. National Ass'n. of Insecticide and Disinfectant Manufacturers, Inc., Mid-Summer Meeting, Hotel Edgewater Beach, Chicago, Ill.
June 16-20. The American Society of Mechanical Engineers, Semi-Annual Meeting, Kansas City, Mo.
June 22-26. American Water Works Ass'n., Royal York Hotel, Toronto, Canada.
June 23-25. The American Leather Chemists' Ass'n., Annual Meeting, The Sagamore, Bolton Landing on Lake George, N. Y.
Week June 22. American Pharmaceutical Mfrs.' Ass'n., Annual Meeting, New Ocean House, Swampscott, Mass.
June 23-27. American Society for Testing Materials, Annual Meeting and Exhibit of Testing Apparatus and Related Equipment, Chicago, Ill.

July

July 23-25. American Society of Civil Engineers, Annual Convention, San Diego, Calif.

August

September

Sept. 3. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Sept. 10. Gypsum Ass'n., Fall Meeting, Commodore Hotel, New York City.
Sept. 8-12. American Chemical Society, Semi-Annual Meeting, Atlantic City, N. J.
Sept. 18. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Sept. 18. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Sept. 22-25. Illuminating Engineering Society, Atlanta Biltmore Hotel, Atlanta, Ga.
Sept. 29. National Wholesale Druggists' Ass'n., Annual Convention, Greenbrier Hotel, White Sulphur Springs, W. Va.

October

Oct. 1. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Oct. 2. Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
Oct. 1-4. Electrochemical Society, Inc., Semi-Annual Meeting, Chicago, Ill.
Oct. 6-10. The National Ass'n. of Retail Druggists, 43rd Annual Convention, Statler Hotel, Cleveland, O.
Oct. 6-10. National Safety Council, Stevens Hotel, Chicago.
Oct. 12-15. The American Society of Mechanical Engineers, Fall Meeting, Louisville, Ky.
Oct. 13-16. Society of Motion Picture Engineers, Hotel Pennsylvania, New York City.
Oct. 15-17. American Society of Civil Engineers, Fall Meeting, Chicago, Ill.
Oct. 16. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Oct. 16. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.
Oct. 20-24. American Society for Metals, National Metal Congress, National Metal Exposition, Philadelphia, Pa.
Week of Oct. 20. American Gas Ass'n., Annual Convention, Atlantic City, N. J.
Oct. 27-31. National Electrical Manufacturers' Ass'n. (Annual Meeting), Waldorf-Astoria Hotel, New York City.
Oct. 31-Nov. 1. American Ass'n. of Textile Chemists & Colorists, Annual General Meeting, Hotel Carolina, Asheville, N. C.

November

Nov. 3-7. American Petroleum Institute, 22nd Annual Meeting, San Francisco, Calif.
Nov. 5. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Nov. 6. Indianapolis Paint, Varnish & Lacquer Ass'n., Columbia Club, Indianapolis, Ind.
Nov. 20. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.
Nov. 20. New England Paint & Varnish Production Club, Regular Monthly Meeting, Hotel Vendome, Boston, Mass.

December

Dec. 1-5. The American Society of Mechanical Engineers, Annual Meeting, New York City.
Dec. 3. American Institute of Consulting Engineers, Luncheon Meeting, City Midday Club, New York City.
Dec. 4. Indianapolis Paint, Varnish & Lacquer Ass'n., Ladies' Night, Columbia Club, Indianapolis, Ind.
Dec. 18. Louisville Paint & Varnish Production Club, Brown Hotel, Louisville, Ky.

New Trade Marks of the Month

SARAN
436,424

SAN-I-TANKS
435,134

CASCOPHEN
434,774

BOLOPOR
435,755

X-50
436,309

PERMAFLEX
435,478

GYCOLUCE
433,782

NYLAMINE
436,487

NU-LYE
383,281

AHCOVEL
436,683

NUPORALS
435,815

OINTLETS
435,818

INDALONE
436,746

Vita-Vim
436,819

SEABOARD CHEMICAL COMPANY
383,274

SMUDGNIL
434,167

LIBERTY RUBBER
435,455

WRINSHEEN
436,280

MIRROPHANE
436,481

TESTERLITE CLEANER
430,979

Austin's
434,708

CASTUNG
436,955

DELTYL
432,526

GARLEX
429,213

DEE-SOLV
436,420

CLIMAX
434,820

PYSEAL
436,381

PERMA-PEP
429,097

DOWFUME
434,714

MITIN
436,173

ASPIDASI I.S.M.
436,342

436,174

PERMASILK
436,495

NNOR
436,536

Pembucol
436,624

JVA
436,709

BROMOSOLV
437,199

Trade Mark Descriptions †

436,424. The Dow Chemical Co., Midland, Mich.; Sept. 27, 1940; for thermoplastic synthetic resins comprising polymers and co-polymers derived from vinylidene chloride, since Aug. 21, 1940.

435,134. Metal Glass Products Co., Belding, Mich.; Aug. 19, 1940; for glass lined stainless steel tanks; since July 15, 1932.

434,774. The Borden Company, New York, N. Y.; Aug. 8, 1940; for glues; since July 5, 1940.

435,755. General Chemical Co., New York, N. Y.; Sept. 7, 1940; for cleaning preparation for cleaning closet bowls, bathroom cleaning purposes, and the like; since July 24, 1940.

463,309. Libby-Owens-Ford Glass Company, Toledo, Ohio; Sept. 24, 1940; for adhesive cement; since June 14, 1940.

436,487. Swift and Company, Chicago, Ill.; Sept. 28, 1940; for glue; since Aug. 23, 1940.

433,782. Geigy Company, Inc., New York, N. Y.; July 9, 1940; for dyes and dyestuffs; since April 30, 1940.

435,478. Sharp & Dohme, Inc., Philadelphia, Pa.; Aug. 28, 1940; for substances having chemical and physiological properties;

383,281. Not subject to opposition. Recorg Supply Corp.; Chicago, Ill.; July 29, 1940; for lye; since Dec. 1, 1936.

436,683. Arnold, Hoffman & Co.; Inc., Providence, R. I.; Oct. 7, 1940; for chemical products for use in processing textiles; since Mar. 31, 1939.

435,815. Society of Chemical Industry in Basle, Basel, Switzerland; Sept. 9, 1940; for anesthetic throat lozenges; since June, 1940.

435,818. Society of Chemical Industry in Basle, Basel, Switzerland; Sept. 9, 1940; for male sexual hormone; since Mar. 15, 1940.

436,746. U. S. Industrial Chemicals, Inc., New York, N. Y.; Oct. 8, 1940; for insecticide; since Sept. 20, 1940.

436,819. Nyal Company, Detroit, Mich.; Oct. 10, 1940; for general tonic and for use in the treatment of certain types of vitamin deficiencies; since Feb. 1, 1921.

383,274. Not subject to opposition; L. Ewing Scott, (Seaboard Chemical Company) Los Angeles, Calif.; Feb. 5, 1940; for chemical preparations for use in sealing cuts and wounds on trees and shrubs; since Oct. 1938.

434,167. Ansbacher Siegle Corporation, New York, N. Y.; July 20, 1940; for varnishes for water color inks; since May 31, 1940.

435,455. The B. F. Goodrich Co., New York, N. Y.; and Akron, O.; Aug. 28, 1940; for composite material composed wholly or in part of natural and/or synthetic rubber-like materials; since June 6, 1940.

436,280. New Wrinkle, Inc., Dayton, O.; Sept. 23, 1940; for resins used in the manufacture of wrinkle finishes and other paint products; since June 12, 1940.

436,481. Oneida Paper Products, Inc., New York, N. Y.; Sept. 28, 1940; for cellulose film, glassine or paper bags, which are sold in trade empty; since Sept. 1, 1940.

430,979. Tes Ter Lite Cleaner Company; Montgomery, Ala.; Apr. 19, 1940; for detergent; since Feb. 26, 1940.

434,708. Harry G. Austin (James Austin Co.,) Pittsburgh, Pa.; Aug. 6, 1940; for household cleaner, carpet cleaner, paint cleaner, metal polish and wallpaper cleaner; since May 1, 1890.

436,955. The Baker Castor Oil Co., New York, N. Y.; Oct. 15, 1940; for dehydrated castor oil and modified dehydrated castor oil for use in the manufacture and modification of resins; since Sept. 15, 1937.

432,526. Givaudan-Delawanna, Inc., New York, N. Y.; May 31, 1940; for normally liquid organic chemical products; since Apr. 7, 1937.

429,213. Louis A. Blackton, (Garlex Company) New York, N. Y.; Mar. 5, 1940; for pharmaceutical preparation used for mildly stimulating the activity of the kidneys, and aiding in intestinal elimination; since Mar. 4, 1939.

436,420. Circo Products Co., Cleveland, O.; Sept. 27, 1940; for solvents for cleaning and degreasing automobile parts and machinery parts. Since Oct. 3, 1937.

434,820. United States Rubber Co., New York, N. Y.; Aug. 8, 1940; for adhesive tape for use by bricklayers for the protection of their hands; since Oct. 6, 1938.

436,381. Fisher Scientific Company, Pittsburgh, Pa.; Sept. 26, 1940; for adhesive sealing compound employed to join glass tubing, make bottle stopper closures, and otherwise seal together metal, glass, porcelain, and wood parts; since Sept. 23, 1940.

429,097. Lakeside Products, Inc., Chicago, Ill.; Mar. 1, 1940; for chemical composition for increasing the life of storage batteries; since Feb. 8, 1940.

434,714. The Dow Chemical Company, Midland, Mich.; Aug. 6, 1940; for fumigants for the control of insects in the egg, larval of adult stages; since Jan., 1932.

436,173. Geigy Company, Inc., New York, N. Y.; Sept. 20, 1940; for chemicals adapted for the mothproofing of fibers and fabrics; since Mar. 20, 1940.

436,342. Italian Drugs Importing Co., Inc., New York, N. Y.; Sept. 25, 1940; for pharmaceutical preparation—namely, a viper serum, used as an analgesic for neuralgic pains and tabetic pains; since Mar., 1931.

436,174. Geigy Company, Inc., New York, N. Y.; Sept. 20, 1940; for chemicals adapted for mothproofing of fibers and fabrics; since Mar. 20, 1940.

436,495. J. B. Calva, (J. B. Calva & Co.,) Minneapolis, Minn., Sept. 30, 1940; for hair treating materials, since Aug. 1940.

436,536. Atlas Powder Co., Wilmington, Del., Oct. 1, 1940; for agricultural parasiticides; since Aug. 23, 1940.

436,624. Novocol Chemical Mfg. Co., Inc., Brooklyn, N. Y., Oct. 3, 1940; for hypnotics, particularly sodium ethyl 1 methyl butyl barbiturate; since Sept. 5, 1940.

436,709. Josephine V. Atamian, (Josie V. Atamian) Hartford, Conn., Oct. 8, 1940; for medicinal preparation for use in the treatment of venereal diseases; since Aug. 23, 1940.

437,199. Givaudan-Delawanna, Inc., New York, N. Y.; Oct. 23, 1940; for dye-containing liquids used in cosmetic compositions; since Oct. 8, 1940.

437,085. Federated Foods, Inc., Chicago, Ill., and San Francisco, Calif.; Oct. 19, 1940; for ammonia and bleach; since Apr. 30, 1938 on ammonia; since Sept. 27, 1938 on bleach.

436,967. W. C. Hardesty Company, Inc., New York, N. Y.; Oct. 15, 1940; for textile oils and finishing compounds and other soluble and self-emulsifying oils; since Oct. 8,

437,061. General Dyestuff Corp., New York, N. Y.; Oct. 18, 1940; for agents for rendering fabrics water-repellant; since Sept. 25, 1940.

† Trademarks reproduced and described include those appearing in *Official Gazette of the U. S. Patent Office*, November 26 to December 17, 1940.

New Trade Marks of the Month

Del Haven
437,085

LUBRITEX
436,967

RAMASOL
437,061

CELANESE
436,417

PATCH-O-TEX
431,434

MUSK TIBETENE
432,528

ROOFLOY
436,535

EXID
435,935

VITA-SEAL
435,058

ROTOSOLVE
432,529

DESEPTIZING
432,530

CELARES
433,411

434,739

Aerocarb
435,999

SWAN BRAND
436,419

ARLACEL
437,233

ARLITAN
437,235

ARLAMEC
437,234

VITALOIDS
437,345

VITAMASTER
437,346

VITEMPO
437,347

HAM-R-TONE
435,146

ASEPSIZED
422,128

ORMIG
424,886

PMC
430,399

PERANDREN OINTLETS
435,816

COTARCOL
436,650

DEVELOPER GRAPH-O-LITH
436,726

IGNITACORD
436,534

REMOVENE
437,176

MUREX
436,775

AQUAVOYD
436,749

ALUMINOYD
436,748

FLOBLAK
434,469

HYPER-VISCRA
434,626

FULTORK
436,427

OPTABS
432,495

FORTAMIN
435,715

LYGRANUM
436,942

SHOOT TO KILL
437,308

HOOPOE

436,412

PENNZOIL
436,034

(*Trade Mark Descriptions Continued*)

436,417. Celanese Corp. of America, New York, N. Y.; Sept. 27, 1940; for staple fibers made wholly or partially of cellulose derivatives; since May 17, 1926.

431,434. American Anode, Inc., Wilmington, Del., and Akron, O.; May 1, 1940; for latex adhesive compositions for general adhesive, mending and repair purposes; since Feb. 27, 1940.

432,528. Givaudan-Delawanna, Inc., New York, N. Y.; May 31, 1940; for chemical product used as perfume ingredient; since Apr. 28, 1940.

436,535. American Smelting and Refining Co., New York, N. Y.; Oct. 1, 1940; for lead alloys; since July 24, 1940.

435,935. A. Richard Diebold, New York, N. Y.; Sept. 13, 1940; for aluminum hydroxide tablets; since Aug. 20, 1940.

435,058. Frederic E. Lewellyn, (Food Preservatives Co.) West Los Angeles, Calif.; Aug. 16, 1940; for chemical and wax coating on fruits and vegetables for their preservation against decay; since Mar. 1, 1940.

432,529. Givaudan-Delawanna, Inc., New York, N. Y.; May 31, 1940; for chemical products used in liquid preparations employed as insecticides, paints, perfumes, and pharmaceuticals, products used in solutions of rotenone; products used in solutions of active insecticidal ingredients of derris, cube, and timbo; since May 17, 1938.

432,530. Givaudan-Delawanna, Inc., New York, N. Y.; May 31, 1940; for chemical products capable of exhibiting bactericidal, fungicidal, and preservative properties; since May 24, 1940.

433,411. Saks & Company, New York, N. Y.; June 26, 1940; for cosmetics; since May 25, 1940.

434,739. Clan Mfg. Co., Camden, N. J.; Aug. 7. 1940; for disinfectants, deodorants, and insecticides; since December 1930.

435,999. American Cyanamid Company, New York, N. Y.; Sept. 16, 1940; for chemical preparations for case hardening purposes; since Aug. 19, 1938.

436,419. Church & Dwight Co., Inc., New York, N. Y.; Sept. 27, 1940; for baking soda and soda bicarbonate; since 1901.

437,233. Atlas Powder Company, Wilmington, Del.; Oct. 24, 1940; for polyhydric alcohols and derivatives thereof; since Oct. 2, 1940.

437,235. Atlas Powder Company, Wilmington, Del.; Oct. 24, 1940; for polyhydric alcohols and derivatives thereof; since Oct. 2, 1940.

437,234. Atlas Powder Company, Wilmington, Del.; Oct. 24, 1940; for polyhydric alcohols and derivatives thereof; since Oct. 2, 1940.

437,345. Nyal Company, Detroit, Mich.; Oct. 28, 1940; for medicinal preparation used in the treatment of certain vitamin deficiencies; since Oct. 18, 1940.

437,346. Nyal Company, Detroit, Mich.; Oct. 28, 1940; for medicinal preparation used in the treatment of certain vitamin deficiencies; since Oct. 18, 1940.

437,347. Nyal Company, Detroit, Mich.; Oct. 28, 1940; for medicinal preparation used in the treatment of certain vitamin deficiencies; since Oct. 18, 1940.

435,146. Rinshed-Mason Company, Detroit, Mich.; Aug. 19, 1940; for synthetic paint enamel and lacquer; since May 22, 1940.

422,128. B. D. Eisendrath Tanning Company, Chicago, Ill.; July 31, 1939; for leather; since July 25, 1939.

424,886. Firma "Ormig" Organisationsmittel G. M. B. H. Berlin-Tempelhof, Germany, Oct. 25, 1939; for organic solvents for use in spirit duplicating processes; since Nov. 15, 1929.

430,399. Hercules Powder Company, Wilmington, Del.; Apr. 5, 1940; for casein; since Sept. 5, 1939.

435,816. Society of Chemical Industry in Basle, Basel, Switzerland; Sept. 9, 1940; for male sexual hormone; since Mar. 15, 1940.

436,650. Haack Bros. Manufacturing Pharmacists, Portland, Oregon; Oct. 4, 1940; for liquid preparation containing coal tar, ether, acetone, carbon tetrachloride, and collodion to be applied as a coating on the skin for local skin infections; since July 1, 1938.

436,726. Philip A. Hunt Company, Brooklyn, N. Y.; Oct. 8, 1940; for chemicals for developing line and half-tone negatives; since Oct. 2, 1940.

436,534. The Ensign-Bickford Co., Simsbury, Conn., Oct. 1, 1940; for ignition device for use in initiating a number of explosive charges; since Aug. 29, 1940.

437,176. The Neville Company, Neville Island, Pittsburgh, Pa., Oct. 22, 1940; for paint remover; since July 31, 1940.

436,775. The Muralo Company, Inc., New Brighton, N. Y.; Oct. 9, 1940; for cold water paint in dry powder form; since July 8, 1940.

436,749. H. Kirk White and Company, Oconomowoc, Wis.; Oct. 8, 1940; for water proofing paint for cement and other like materials; since July 27, 1940.

436,748. H. Kirk White and Company, Oconomowoc, Wis., Oct. 8, 1940; for aluminum paints in paste and ready mixed form; since May 2, 1940.

434,469. Binney & Smith Co., New York, N. Y.; July 30, 1940; for carbon black for use in the manufacture of ink and carbon paper; since July 2, 1940.

436,626. S. B. Penick & Co., New York, N. Y.; (Lloyd Brothers, Pharmacists, Inc.,) Cincinnati, O.; Oct. 3, 1940; for fluid extract of viscum album and crataegus for use in the treatment of hypertension; since Sept. 24, 1940.

436,427. Fisher Scientific Company, Pittsburgh, Pa.; Sept. 27, 1940; for electric motor with attachments employed as a stirrer, mixer, and test tube washer; since Sept. 23, 1940.

432,495. George W. Taylor, Leeds, England; May 29, 1940; for pharmaceutical preparations in soluble concentrated tablet form; since Nov. 15, 1939.

435,715. Murray L. Goldsborough, Lakeland, Florida; Sept. 6, 1940; for supplementary fortified vegetable food scientifically designed to assure a vitamin and mineral sufficiency; since Oct. 17, 1939.

436,942. E. R. Squibb & Sons, New York, N. Y.; Oct. 14, 1940; for antigenic preparations; since Oct. 7, 1940.

437,308. Alexander Frank, (Feco Exterminating Products), New York, N. Y.; Oct. 26, 1940; for insecticide in liquid form; since Jan. 1939.

436,412. John G. Alexanian (Alexanian & Co.,) South Bend, Ind.; Sept. 27, 1940; for rug cleaning compound; since June 27, 1919.

436,034. The Pennzoil Company; Los Angeles, Calif.; Sept. 16, 1940; for household cleaning fluid; since Aug. 12, 1940.

A Complete Check—List of Products, Chemicals, Process Industries

Agricultural Chemicals

Fertlizer and method of making same. No. 21,638. Reissue. Lewis Treeland.

Fermentation cell for converting organic matter to humus. No. 2,222,651. Jules R. Breuchaud to Underpinning and Foundation Co., Inc.

A new fertilizer material comprising an insoluble phosphatic material and a soluble amine peptizing agent, the said amine forming from 1 to 10 per cent. by weight of the resulting mixture. No. 2,222,734. Wilder D. Bancroft, James K. Wilson and John E. Rutzler, Jr.

A new fertilizer composition comprising a finely divided and substantially insoluble phosphatic material and an alkanolamine. No. 2,222,735. Wilder Bancroft, James K. Wilson and John E. Rutzler, Jr.

A new fertilizer composition comprising a finely divided and substantially insoluble phosphatic material and an aliphatic diamine in peptizng proportions of the class consisting of ethylenediamine, diaminoisopropanol and propylenediamine. No. 2,222,736. Wilder D. Bancroft, James K. Wilson and John E. Rutzler, Jr.

A new fertilizer composition comprising a finely divided and substantially insoluble phosphate material and an amine having a boiling point of more than 65° C. No. 2,222,737. Wilder D. Bancroft, James K. Wilson and John E. Rutzler, Jr.

A new fertilizer comprising a mixture of a finely divided and a substantially insoluble phosphatic material and a heterocyclic nitrogen base containing at least one nitrogen atom in the ring. No. 2,222,738. Wilder D. Bancroft, James K. Wilson and John E. Rutzler, Jr.

Process for the production of compressed fodder mixtures. No. 2,223,904. Max Zentz and Fritz Noll.

Cellulose

Method converting the cellulose in plant waste into sugar. No. 2,222,885. Alfred M. Thomsen.

Cellulosic structure selected from group consisting of esters of cellulose with organic fatty acids, ethers of cellulose, mixed ester-ethers of cellulose with organic acids, and regenerated cellulose containing maganous lactate, and possessing improved resistance to destructive influence of solar light. No. 2,223,893. Heinrich Lohmann to E. I. du Pont de Nemours & Co.

Making board products and recovering water solubles from fibrous lignocellulose material. No. 2,224,135. Robert M. Boehm to Masonite Corp.

A process of purifying cellulose material by treatment with chlorine in aqueous solution in which the chlorine treatment is preceded by acidification of the material to a pH value not greater than pH3 by the addition of a non oxidizing acid. No. 2,226,356. Joseph L. McCarthy and Harold Hibbert and George Tomlinson to Canada Paper Company.

Chemical Specialty

A solid carbonaceous fuel bearing a coating comprising a coloring matter and a sulfonated hydroxylated fish oil fatty acid. No. 2,222,945. Thomas F. Groll, Jr., and George H. Small to National Oil Products Company.

Insecticidal composition comprising reaction product of nicotine and a benzene hydrocarbon. No. 2,222,968. George L. Hockenyos to Monsanto Chemical Co.

A dentifrice comprising an aerogel and dicalcium phosphate. No. 2,222,969. Samuel S. Kistler to Monsanto Chem Co.

Nasal drops containing mineral oil, a glyceride oil phenyl-l amino-2 propanol and an oxygen-containing organic blending agent readily soluble in said glyceride oil and which blending agent readily dissolves phenyl-l amino-2 propanol. No. 2,222,976. Sereck Hall Fox to Sharp & Dohme, Inc.

Method of improving tobacco which comprises treating unfermented tobacco in presence of alkaline agent with highly concentrated solution of hydrogen peroxide there being present during said treatment amount of water not exceeding 20 liters per 100 kilograms of tobacco being treated. No. 2,223,053. Hermann Baier and Paul Langenkamp to Deutsche Gold und Silber Scheideanstalt.

Binder for fibrous materials. No. 2,223,086. Robert C. Williams and James F. Hall to The Ironsides Co.

The method which comprises reacting casein and a urea to form a paste, and thinning the paste with ammonia, by cooking the paste in the presence of an excess of ammonia under superatmospheric pressure. No. 2,223,120. John J. Murray.

A fungicidal composition for the prophylaxis of athlete's foot comprising para-nitrophenol, water and water soluble inorganic salt which is chemically non-reactive with said para-nitrophenol. No. 2,223,142. Clarence L. Weirich to The C. B. Dolge Co.

Process removing spray residues from fruits and vegetables by use of aqueous solution of inorganic acid containing a sulfonated glycol ester. No. 2,223,168. Bernard A. Dombrow and Louis T. Rosenberg to National Oil Products Co.

An arc welding flux. No. 2,223,230. Thomas C. R. Shepherd to General Electric Company.

Alginated evaporated milk and process of making same. No. 2,223,277. Vernon K. Wilt to Kelco Co.

A bituminous composition. No. 2,223,289. Charles R. Lyons to Stelwagon Mfg. Co.

Insecticide comprising a decoction of habak and a solvent. No. 2,223,367. Howard D. Hively.

Process of treating grains, legumes, flour, cereals, and alimentary pastes to increase their resistance to mould growth and to fix therein the yellow color of natural grain. No. 2,223,387. Oreste Scalise.

New luminescent material comprising a magnesium cadmium tungstate containing an excess of about 0.1 mol. of magnesium oxide per mol. of tungstic oxide. No. 2,223,425. Alfred H. McKeag to General Electric Co.

Luminescent material for gaseous electric discharge lamps comprising essentially magnesium tungstate containing magnesium oxide. No. 2,223,426. Alfred H. McKeag and John T. Randall to General Electric Company.

Production of a special beer with a low percentage of sugar. No. 2,223,444. Hans Distler to Paul J. Winter.

A stabilized yeast containing a fatty acid partial ester of a polyhydric alcohol having at least 4 C atoms and at least 4 OH groups as stabilizing agent. No. 2,223,464. Alfred S. Schultz and Charles N. Frey to Standard Brands, Inc.

A yeast containing glycerol monolaurate as stabilizing agent. No. 2,223,465. Alfred S. Schultz and Charles N. Frey to Standard Brands, Inc.

Improvement in art of preparing fermentable mashes. No. 2,223,520. John P. Ioannu.

Treatment of cashew nut shell liquid. No. 2,223,549. Mortimer T. Harvey to The Harvel Corp.

Plastic emulsions of oleaginous and aqueous materials. No. 2,223,558. Albert K. Epstein.

A heat energizable adhesive composition capable of forming high joint strength. No. 2,223,575. Earle C. Pitman to E. I. du Pont de Nemours & Co.

Art of producing fermented malt beverages. No. 2,223,753. James S. Wallerstein to Wallerstein Co., Inc.

Process preparing improved asphalt of high viscosity at elevated temperatures and good ductility at low temperature. No. 2,223,776. Alvin P. Anderson to Shell Development Company.

Process impermeabilizing or solidifying waterbearing strata comprising introducing therein a solution of asphalt bitumen in organic water-miscible solvent, said solution being fluid and adapted to precipitate asphalt as an insolute when diluted with water. No. 2,223,789. Hijman Limburg to Shell Development Co.

Adhesive composition which comprises admixture of at least two synthetic resins which are esterification products of a terpenemaleic anhydride condensate and a glycol and which are esterification products of different glycols. No. 2,224,035. John H. Long to Hercules Powder Co.

Method preparing a gelatin product. No. 2,224,167. William E. Stokes and Margaret H. Kennedy to Standard Brands, Inc.

Method making composition suitable for linoleum or the like. Nos. 2,224,237-238. Donald H. Spitzli and Reeves L. Kennedy to Congoleum Nairn, Inc.

An insecticide containing as its essential active ingredient, 2-furan acrylamide. No. 2,224,243. Charles V. Bowen to Henry A. Wallace and his successors.

Method of processing wood for the rapid maturation of whisky and other alcoholic liquors and wines. No. 2,224,352. Ernst T. Krebs and Ernst T. Krebs, Jr.

Process of manufacturing washing, cleansing, wetting, and emulsifying agents. No. 2,224,360. Meindert D. Rosenbroek, ½ to Naamlooze Vennootschap: Chemische Fabriek Servo.

Composition of matter which on being burned will give off a light smoke for driving off mosquitoes and the like comprising charcoal, resin, wood tar and vegetable pulp all mixed with sufficient water to mold under pressure into suitable shapes. No. 2,224,622. Frank A. Waples, deceased, by Cora R. Waples.

A corrosion inhibitor for metal surfaces comprising an ester of an acid of phosphorus in an oil vehicle. No. 2,224,695. Carl F. Prutton.

A dry abrasive for fine grinding comprising a dry mixture of powdered silicon carbide, powdered flint, and precipitated copper hydroxide, the grain size of silicon carbide not exceeding 20 microns and the grain size of the flint not exceeding 5 microns in size. No. 2,224,711. Arthur J. Weinig.

1. A horticultural contact insecticide consisting of nitrated olefins, said olefins derived from petroleum. 2. A contact insecticide which comprises nitrohydrazones. No. 2,224,723. Carleton Ellis to Standard Oil Development Co.

Process preventing tobacco leaves from becoming brown comprises dipping said leaves in an aqueous solution of formic acid at temperature of about 80-100°. No. 2,224,833. Georg Pfeutzer and Hermann Losch to I. G. Farbenindustrie Aktiengesellschaft.

Detergent germicides. Nos. 2,224,889-890. Arthur L. Waugh.

Resin-impregnated sheet material and process for producing the same. No. 2,224,992. Leslie T. Sutherland to The Barrett Co.

A fused carbide composition. No. 2,225,152. John A. Boyer and Carl G. Rose to The Carborundum Co.

A low melting lead borosilicate glaze composition suitable for decorating glass or other ceramic ware. No. 2,225,159. Alden J. Deyrup to E. I. du Pont de Nemours & Co.

Opaque white glaze for decorating glassware. No. 2,225,160. Alden J. Deyrup to E. I. du Pont de Nemours & Co.

Low-melting glaze for decorating glassware. No. 2,225,161. Alden J. Deyrup to E. I. du Pont de Nemours & Co.

A sulfide-resistant, low-melting, vitrifiable enamel suitable for decorating glassware, containing as melted in ingredients thereof, titanium dioxide and lithium oxide. No. 2,225,162. Alden J. Deyrup to E. I. du Pont de Nemours & Co.

A petroleum demulsifying composition. No. 2,225,189. Truman B. Wayne.

Addition and stabilizer agent for lubricating oils and hydrocarbon liquids (metal—alkoxide—carboxylates). No. 2,225,197. Bert A. Stagner.

Wood filler. No. 2,225,262. Joseph B. Dietz and Edmund F. Oeffinger to E. I. du Pont de Nemours & Co.

Oral prophylactic. No. 2,225,284. William M. McDonald.

A translucent extender for printing ink including as essential ingredient a colloidal agent which is a hydrous oxide of an element of fourth group of periodic table and of an atomic weight of at least 14. No. 2,225,289. William H. Wood to Harris-Seybold-Potter Co.

Mothproofing compound and method of using. No. 2,225,352. Lawrence W. Roberts.

Waxing and polishing composition containing, as waxing constituent, an N-alkyl phthalimide in which the alkyl group contains at least six carbon atoms. No. 2,225,392. William O. Pool and James Harwood to Armour and Company.

Method of separating the heart and sap wood constituents of coniferous woods. No. 2,225,459. George V. Palmrose to Weyerhaeuser Timber Company.

Process for improving adhesive properties of an asphaltic bitumen. No. 2,225,570. Johan P. Pfeiffer to Shell Development Co.

Insecticide, fungicide, bactericide and the like containing as active ingredient an organic sulfide having at least one sulfur atom attached to two directly connected C atoms. No. 2,225,573. Henricus J. C. Tendeloo to Shell Development Co.

U. S. Chemical Patents
Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 234

U. S. Chemical Patents

Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 235

An insecticidal and fungicidal composition comprising as toxic ingredient a cyclohexylamine salt. No. 2,225,619. Edgar C. Britton & Frank B. Smith to The Dow Chemical Co.

Method for the concentration and preservation of food products and biological substances. No. 2,225,627. Earl W. Flosdorf to F. J. Stokes Machine Company.

Luminescent material comprising a luminescent tungstate intimately admixed with a white carbonate which is substantially insoluble in water. No. 2,225,704. Alfred Hamilton McKeag to General Electric Company.

Method of preparing meat products which comprises inoculation comminuted meat with Lactobacilli and permitting the Lactobacilli to grow therein. No. 2,225,783. Lloyd B. Jensen and Levi S. Paddock.

Fireproofing composition consisting of mixture of approximately equal quantities of borax, acid ammonium phosphate and alkaline ammonium chloride together with percentual addition of not more than 10% of irradiated destrine as adhesive agent. No. 2,225,831. Walter Herz.

Composition for carroting fur comprising zinc sulfate acetic acid a peroxidizing agent and an hydrolyzing agent. No. 2,225,843. Wm. Page and Morris Lefkowitz.

An anti-freeze fluid comprising alcohol, mineral oil distillate, oil soluble sulfonates, water, borax, soap, water soluble dye and sufficient alkali to give pH of 9.5 to a 40% solution of said antifreeze in water. No. 2,225,866. John B. Holtzclaw and Anton Harmsen and Henry H. Cooke to Stanco, Inc.

Fungicidal composition suitable for use on living plants which comprises at least four parts of a copper oxide to one part of zinc oxide. No. 2,225,867. Loren C. Hurd to Rohm & Haas Co.

Method making abrasive coated products. No. 2,225,937. John A. Williamson to The Carborundum Company.

A flexible self-sustaining water-soluble sheet having detergent properties comprising soap as a major constituent and a hydrophilic polymerized vinyl compound. No. 2,226,075. Charles S. Rowe, E. I. du Pont de Nemours & Co.

Steel pickling bath containing an inhibitor for preventing corrosion of metal by dilute acids. No. 2,226,106. Wm. J. Ryan and Marcus T. Kendall to The Texas Company.

A composition of matter. Nos. 2,226,124-126. Melvin De Groote, Bernhard Keiser, and Charles M. Blair, Jr., to Petrolite Corp., Ltd.

Steam-pipe insulation covering comprising canvas and directly on the canvas, a heat-resisting paint comprising an asphalt, an oil-resin varnish, a metallic bronze powder, and an extending pigment, whereby the canvas is preserved. No. 2,226,150. Robert C. Alborn to Eastman Kodak Co.

Composition of matter for use in deodorizing the human body without inhibition of normal perspiration containing as active ingredient substantially water insoluble alkyl substituted hydroquinone. No. 2,226,177. John W. Orelup and Ernst Ohlsson.

A photographic element containing gelatin and having as a bacteria inhibiting agent a pseudo ester of a halogen substituted aldehyde acid incorporated therein. No. 2,226,183. Cyril J. Staud and Catherine S. Popper to Eastman Kodak Co.

Nicotine insecticide and method of making same. No. 2,226,389. Ray Riley to The Permutit Company.

Vitreous composition resulting from fusion of mixture containing 81% HPO_3, 7.5% Al_2O_3, 4.5% $BaCO_3$, 1-10% $Fe_3(PO_4)_2.8H_2O$. No. 2,226,418. Edgar D. Tillyer, Harold R. Moulten, Townsend M. Gunn to American Optical Co.

A brake fluid comprising 2 methyl pentane 2,4 diol as its major constituent, and added diluent the major part of which is constituted by at least one monohydric alcohol of from 4 to 6 carbon atoms. No. 2,226,487. Donald G. Zink to U. S. Industrial Alcohol Co.

Luminescent material. No. 2,226,512. George E. Holman to Hygrade Sylvania Corp.

Coal Tar Chemicals

Esters of perylene-carboxylic acids and a process of producing them. No. 2,223,453. Karl Koeberle and Otto Schlichting to General Aniline & Film Corp.

Apparatus for effecting distillation of coal or other carbonaceous substances. No. 2,223,897. Robert Nisbet to British Smokeless & Oil Fuels, Ltd.

Process resinifying 1.3-diamino benzene and a member of group consisting of polymerized ethylene imine, polymerized propylene imine, polyethylene diamine, and polypropylene diamine with formaldehyde. No. 2,223,930. Robert Griessbach, Kreis Bitterfeld, Erhard Meier, and Hans Wassenegger to I. G. Farbenindustrie Aktiengesellschaft.

Process for obtaining difficultly volatile products from a bituminous substance selected from group consisting of pitches, tars, bitumens, waxes and mixtures of coal with tar oils. No. 2,224,685. Leopold Kahl to Rutgerswerke-Aktiengesellschaft.

Process for preparing 2-amino-4-chloropyrimidine. No. 2,224,811. Jackson P. English to American Cyanamid Co.

Manufacture of aromatic sulfones. No. 2,224,964. Johann Huismann to General Aniline & Film Corp.

Process for preparation of para cresol. No. 2,225,564. John W. Le Maistre, Hal H. Strickland, Jr., and Joe C. Weaver, Jr., to Theodore Swann.

Alkyl esters of sulfato-carboxylic acids. No. 2,225,673. James Herbert Werntz to E. I. du Pont de Nemours & Co.

Amino-pyrido-pyridines and a method of making same. No. 2,226,111. Arthur Binz and Otto von Schickh to Schering Corp.

Method cracking coal-tar oils. No. 2,226,261. Joseph Rivkin to The Neville Co.

Process of preparing a polycarboxylic acid which comprises the step of oxidizing a cycloaliphatic sulfate. No. 2,226,357. John F. Olin, Frederick P. Fritsch to The Sharples Solvents Corp.

Coatings

A metal protecting composition comprising a mineral oil and having dissolved therein a film stiffening base of metallic sperm oil soap and sperm anilid. No. 2,223,458. Edward A. Nill to The H. A. Montgomery Co.

Preparation for use in carbon coating television tubes. No. 2,223,924. Karl Stephan to J. D. Riedel-E de Haen Akt.-Ges.

Process for the production of luminous enamel. No. 2,224,516. Walter Kerstan, Heinrich Diehl and Wilhelm Deseke to Auergesellschaft Aktiengesellschaft.

Thermally stable coating composition from vinylidene chloride resins. No. 2,224,944. George H. Young to Stoner-Mudge, Inc.

A coating composition comprising a heat hardening urea-formaldehyde resin and from about 0.05% to 4.5% of chlorinated rubber. No. 2,225,256. William P. Colio to E. I. du Pont de Nemours & Company.

Durable coating composition comprising a synthetic alkyl resin enamel and a non-bleeding, insoluble pigment ingredient, and manganese salt of the azo dye formed by coupling diazatized alpha naphthylamine with 1-naphthal-5-sulfonic acid as a pigment. No. 2,225,664. Alfred Siegel to E. I. du Pont de Nemours & Co.

Azo pigment and coating composition containing same. No. 2,225,665. Alfred Siegel to E. I. du Pont de Nemours & Co.

Coating composition containing vegetable drying oil of type which rapidly develops skin formation in the bulk condition having incorporated therein a skin retarder comprising an alkylated polyhydric phenol, said alkyl substituent containing a plurality of carbon atoms. No. 2,225,918. George D. Martin to Monsanto Chemical Co.

Coating composition containing drying oil of type which rapidly develops skin formation, having incorporated therein a retarder of skin formation consisting of a halogenated polyhydric phenol. No. 2,225,919. George D. Martin to Monsanto Chemical Co.

Luminescent coating mixture for application to interior of mercury vapor discharge device comprising luminescent silicate admixed with compound of group consisting of carbonates of barium, strontium, calcium, zinc, cerium and therium. No. 2,226,404. Henry Grainger Jenkins and Alfred Hamilton McKeag to General Electric Co.

Luminescent material containing as essential elements cadmium, manganese, chlorine, phosphorous and oxygen and also not over 1% of one or more additional metals of group consisting of vanadium, columbium tantulum and tin. No. 2,226,407. Alfred H. McKeag to General Electric Co.

Dyes, Stains, Etc.

Acyl derivatives of azo dyestuffs and process of producing same. No. 2,222,733. Franz Ackerman to Society of Chemical Industry in Basle.

Disazo dyestuffs and their manufacture. No. 2,222,749. Adolf Krebser to J. R. Geigy A. G.

Monoazo dyestuffs insoluble in water. No. 2,222,763. Ernst Fisher to General Aniline & Film Corp.

Azo dyestuffs insoluble in water. No. 2,222,775. Wilhelm Kunze to General Aniline & Film Co.

Art of increasing fading resistance of dyestuffs. No. 2,222,973. Johan Bjorksten to Ditto, Inc.

Water-soluble organic dyestuff. No. 2,224,112. Hans Krzikalla and Heinrich Wenning to General Aniline & Film Corp.

Azo compounds and material colored therewith. No. 2,224,144. Joseph B. Dickey and James G. McNally to Eastman Kodak Co.

In production of dyeings and prints from dyestuffs of the N-dihydro-1:2-2′:1′-dianthraquinone-azine group with the aid of leucoester salts of these dyestuffs by acid oxidation, a process for obviating overoxidation. No. 2,224,280. Ben Verity to Durand & Huguenin A. G.

Azo dyestuffs insoluble in water and fiber dyed therewith. No. 2,224,317. Kurt Schimmelschmidt and Oskar Achneider to General Aniline & Film Corp.

Azo pigment composition. No. 2,224,574. Thomas A. Martone to E. I. du Pont de Nemours & Co.

Process for uniformly dyeing loose wool and other unmixed wool and woolen materials which do not have level-dyeing properties because of uneven exposure to atmospheric influences. No. 2,224,927. Edward Race, Frederick M. Rowe and John B. Speakman to Imperial Chemical Industries, Ltd.

Dyestuffs of the anthraquinone series and process of making same. No. 2,225,013. Walter Kern to Society of Chemical Industry.

Anthraquinone dyestuffs. No. 2,225,061. Frank Lodge to Imperial Chemical Industries, Ltd.

Azo dyestuffs insoluble in water and fiber dyed therewith. No. 2,225,120. Herbert Kracker, Arthur Zitscher and Robert Schmitt to General Aniline & Film Corp.

Printing colors suitable for printing vegetables. No. 2,225,384. Charles Graenacher and Max Matter to Society of Chemical Industry in Basle.

A copper phthalocyanine dyestuff dissolving in concentrated H_2SO_4 giving a green coloration, being insoluble in organic solvents and forming violet-blue crystals. No. 2,225,441. Willy Braun and Karl Koeberle to General Aniline & Film Corp.

Azo dyestuffs. No. 2,225,443. Richard Fleischhauer and Ernst Korten to General Aniline & Film Corp.

Water soluble oxazine dyestuff for wool and leather. No. 2,225,476. Fritz Hess and Heinz Pardon to General Aniline & Film Corp.

A dye stain comprising a soluble dye dissolved in a normally liquid N-alkyl substituted amide of a lower monocarboxylic aliphatic acid, free of acidic and basic substituents. No. 2,225,603. Herbert A. Lubs to E. I. du Pont de Nemours & Co.

Azo compounds and fiber dyed therewith. No. 2,225,651. James G. McNally and J. B. Dickey to Eastman Kodak Company.

Preparation of vitrifiable ceramic coloring adapted to be applied to glassware and like comprising mixing finely ground glass enamel with oil and a solvent for the oil and driving off the solvent. No. 2,225,659. Victor Hawthorne Remington and Ray Andrews to B. F. Drakenfeld and Co., Inc.

Method of coloring vitreous articles. No. 2,225,729. Gerald White to Libbey-Owens-Ford Glass Co.

A dye selected from the group consisting of thiazinopseudocyanine dyes and thiazinoisocyanine dyes. No. 2,226,153. Bernard Beilenson to Eastman Kodak Co.

A carbocyanine dye. No. 2,226,156. Leslie G. S. Brooker and Robert H. Sprague to Eastman Kodak Co.

Azo compounds having general formula R—R=—N—R, where R is residue of member of group consisting of aryl nucleus of benzene series and a benzathiazole nucleus, R, represents residue of member selected from group consisting of a 4-phenol-morpholone-(2) and a 4-napthyl-morpholone-(2) nucleus. No. 2,226,174. James G. McNally and Joseph B. Dickey to Eastman Kodak Co.

Azo dye compounds and material colored therein. No. 2,226,198. Joseph B. Dickey and John R. Byers, Jr., to Eastman Kodak Co.

Azo compounds and materials colored therewith. No. 2,226,199. Joseph B. Dickey to Eastman Kodak Co.

U. S. Chemical Patents

Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 236

Equipment and Apparatus

Method and apparatus for distributing parasiticides. No. 2,222,598. Robert B. Arnold to Tobacco By-Products and Chemical Corp.

Apparatus for controlled treatment of fluids. No. 2,222,623. Raymond C. Lassiat to Houdry Process Corp.

Impregnating apparatus. No. 2,222,630. George Pickford and Bernard S. Lee to United Shoe Machinery Corp.

Device for preventing the escape of fluid under pressure. No. 2,222,654. John S. Donaldson.

Apparatus for the removal of liquids from masses of material associated therewith. No. 2,222,664. Johann Helle and Alfons Kunz to Nitrokemia Ipartelepek Reszvenytarsasag.

Pipette cleaner. No. 2,222,676. Alfred C. Mahler to A. S. Aloe Co.

Means for extracting a constituent of a gaseous medium. No. 2,222,-828. Robert G. Guthrie to Peoples Gas By-Product Corp.

Apparatus for electroprocessing. No. 2,222,839. Wesley F. Hall & George B. Hogaboom to Hanson-Van-Winkle-Munning Co.

Apparatus for vapor phase catalytic oxidation of hydrocarbons. No. 2,222,870. Walter H. Kniskern to The Solvay Process Co.

Catalyst chamber and catalyst regeneration system. No. 2,223,268. William B. Plummer to Standard Oil Co.

Device for introducing gases in a finely subdivided form into liquids. No. 2,223,348. Karl Boedeker and Oskar Kohler to Walther H. Duisberg.

Apparatus for conditioning or desurfacing metal. No. 2,223,402. James H. Buckman and Homer W. Jones to The Linde Air Products Co.

Fractionating tower. No. 2,223,556. Dan L. Dodds 40% to J. V. Hamilton.

Apparatus for use in degreasing process. No. 2,223,595. Edward L. Blakeslee to G. S. Blakeslee & Co.

Method and apparatus for filtering liquids. No. 2,223,623. Robert J. Kaupal and Walter H. Green to International Filter Co.

Apparatus for continuous extraction of oil from seed. No. 2,223,747. Heinrich Suss to Maschinen-und Metallwaren-Handelsgesellschaft m.b.H.

Apparatus for the distillation of liquids having relatively high boiling points. No. 2,224,025. Karl Sondermann to American Lurgi Corp.

Gas and liquid contact apparatus. No. 2,224,221. Henry L. Galson to Carrier Corp.

Adapter for reagent bottles. No. 2,224,222. William O. Geyer.

Apparatus for testing the crush strength of paper. No. 2,224,248. Robert J. Blum and Maurice W. Gilbert.

Method of preserving flowers and apparatus therefore. No. 2,224,284. William K. Barnett.

Method continuously dissolving a solid cold swelling starch product in a liquid. No. 2,224,355. Fredrik A. Moller to Naamlooze Vennootschap: W. A. Scholten's Chemische Fabrieken.

Apparatus for the reclaiming and refining of white metals from dross, skimmings, and scruff. No. 2,224,501. Thomas B. Cooper of ½ to Philip N. Bernheimer.

Thermocouple comprising an element electropositive to platinum and an element electronegative to platinum, the latter element consisting essentially of nickel, copper and a substantial amount but not more than 1.5 per cent. silicon. No. 2,224,573. Matthew A. Hunter to Driver-Harris Co.

High Vacuum distillation. No. 2,224,621. Vanderveer Voorhees to Standard Oil Co.

Apparatus for separating water from oil. No. 2,224,624. Gale L. Adams, Roy G. Barlow and Abraham Shapiro to Socony-Vacuum Oil Co., Inc.

A membrane support for use in a dialyzer. No. 2,225,024. George H. Weber to Brosites Machine Co., Inc.

A bubble tray assembly for fractionating column. No. 2,225,390. Povl Ostergaard to Gulf Oil Corp.

Regulation of temperature of chemical reactions. No. 2,225,634. Eugene J. Houdry to Houdry Process Corp.

A colloid mill. No. 2,225,797. Hermann Plauson.

Solvent extraction apparatus. No. 2,225,799. Harry S. Robinson to The French Oil Mill Machinery Co.

Apparatus for cleaning gases. Nos. 2,226,127-128. Robert R. Harmon to Peabody Engineering Corp.

Ore extraction apparatus. No. 2,226,164. Arthur J. Elian and Charles F. Parraga to Vacuum Process Extraction Corp.

A flotation process. No. 2,226,170. Franklin P. Lasseter to The Philadelphia and Reading Coal and Iron Co.

A dialyzer. No. 2,226,337. Hilton W. Casey.

An electron gun for an electric discharge device. No. 2,226,439. Fred H. Nicoll and Bernard J. Mayo to Electric & Musical Industries, Ltd.

Method and apparatus for forming coke, with a relatively small producting of fines. No. 2,226,501. Valentine Meckler, August H. Schutte to The Lummus Co.

Explosives

An explosion rivet containing an explosive composition adapted to expand the same comprising hexamethylene-triperoxide-diamine. No. 2,223,964. Phokion Naoum to E. I. du Pont de Nemours & Co.

Fine Chemicals

Water insoluble or water-resistant starch product. No. 2,222,872. Gerald J. Leuck to Corn Products Refining Co.

Water resistant starch and process. No. 2,222,873. Gerald J. Leuck to Corn Products Refining Company.

Dehydrated starch. No. 2,222,874. Gerald J. Leuck to Corn Products Refining Company.

Alkali treated starch and process for making same. No. 2,222,875. Gerald J. Leuck to Corn Products Refining Co.

Preparation of cerium sulfate. No. 2,222,924. Ludwig Weiss to Deutsche Gold und Silber Scheide-Anstalt.

Concentrated, stable, aqueous solution containing at least one of group of purine bases consisting of theophylline and caffeine in greater than normal concentration, and water soluble salt of purine-acetic acid. No. 2,222,952. Werner Mothes to E. Bilhuber, Inc.

Process of recovering amino acids. No. 2,222,993. Gerrit Toennies to The Lankenau Hospital.

A process for producing 1,1′ ditho bis arylene thiazole which comprises reacting at an elevated temperature upon an aqueous suspension of a 1-mercapto arylene thiazole with chromic acid. No. 2,223,042. William E. Messer to United States Rubber Co.

Process for the catalytic hydrogenation of carboxylic acid substances to amines. No. 2,223,303. Wilbur A. Lazier to E. I. du Pont de Nemours & Co.

Process of preparing hexahydric alcohol borates. No. 2,223,349. Clarence Bremer to Atlas Powder Co.

Compounds of the isoquinoline series as new compounds, 1,3-dimethyl-2-(γ-phenyl-propyl)-6,7- dioxy-tetrahydroisoquinoline and its salts. No. 2,223,373. Fritz Kulz and Carl A. Hornung.

Pregnanol-3-one-20 compounds and process for preparing them. No. 2,223,377. Russell E. Marker to Parke, Davis & Co.

Method for reducing unsaturated germinal gland hormones. No. 2,223,-393. Lothar Strassberger and Erwin Schwenk to Schering Corp.

Method producing aliphatic dibasic acids. No. 2,223,493. Donald J. Loder to E. I. du Pont de Nemours & Co.

Preparation of 4-Chlor-4′-diethylamino benzophenone. No. 2,223,517. Philip D. Hammond and Robert W. Harris to Heyden Chemical Corp.

Process oxidizing 3,4-dihydro-6-methoxynaphthalene with compound selected from group consisting of perbenzoic and perphthalic acid in presence of organic solvent inert to initial solvents. No. 2,223,664. Walter Salzer to Winthrop Chem. Co., Inc.

Derivatives of β-(P-hydroxyphenyl)-isopropylamine. No. 2,223,686. Gustav Hildebrandt to E. Billhuber, Inc.

Thioacetalsulfonic acide and a process of making same. No. 2,223,693. Henry Martin and Rudolf Hirt to J. R. Geigy S. A.

Metal catalyst and its preparation. No. 2,223,777. Otto Beeck and Frederick F. Rust to Shell Development Co.

Regulation of hydrogen ion concentration by means of calcium salts of fermentable organic acids. No. 2,223,788. David A. Legg and Hugh R. Stiles to Commercial Solvents Corp.

Process of producing alkyl peroxides and hydroperoxides. No. 2,223,-807. Nicholas A. Milas to Research Corp.

Process of preparing halogenated derivatives of acetopropane, which comprises reacting upon a γ acetopropyl ester of a carboxylic acid with sulfuryl chloride. No. 2,223,885. Edwin R. Buchman to Research Corp.

Process for preparing zinc formaldehyde sulfoxylate. No. 2,223,886. Frederick B. Downing to E. I. du Pont de Nemours & Co.

Polymeric sulfonamide, a process for preparing it, and a filament made therefrom. No. 2,223,916. Elmore L. Martin to E. I. du Pont de Nemours & Co.

p-Aminobenzene sulfonamide comphorate. No. 2,223,937. Joseph Ebert to The Farastan Co.

Process for the manufacture of ketones of the cyclopentanopoly hydrophenanthrene series and their enol derivatives. No. 2,224,058. Karl Miescher and Albert Wattstein to Ciba Pharmaceutical Products, Inc.

Substituted 4,4-diominodiphenyl sulfones and process of making them. No. 2,224,156. Morris S. Kharasch and Otto Reinmuth, to Eli Lilly and Co.

Process purifying impure synthetic co-carboxylase containing large amounts of unreacted vitamin B_1, step of treating aqueous neutral solution of said carboxylase with a soluble silver salt. No. 2,224,174. John Weijlard to Merck & Co., Inc.

Method preparing particulate procaine hydrochloride which will remain free-flowing after heat sterilization. No. 2,224,181. Walter G. Christiansen and Edward S. Herlong to E. R. Squibb & Sons.

Amino alkanoloxy aryl arseno compound. No. 2,224,387. Cliff S. Hamilton to Parke, Davis & Co.

An antigenic substance containing an acetylated toxic bacterial organism. No. 2,224,591. Milford J. Boyc and Joseph T. Tamura.

Digitalis glucosides and process for producing the same. No. 2,224,804. Emil Wolf to Georg Henning Chem. Pharm. Werk G. m. b. H.

Glucosides of polyhydroxy-flavones and polyhydroxy flavanones. No. 2,224,807. Max Bockmuhl and Erich Bartholomaus to Winthrop Chemical Co., Inc.

Method of making isopropyl esters of aliphatic acids. No. 2,224,809. Gerald H. Coleman to The Dow Chemical Co.

A method of producing isocytosine which comprises condensing a guanidine salt with formylacetic acid. No. 2,224,836. Richard O. Roblin, Jr., and Jackson P. English to American Cyanamid Co.

Process for conversion of a halogenated polyhydric alcohol to the corresponding hydroxyepoxide. No. 2,224,849. Herbert P. A. Groll and George Hearne to Shell Development Co.

β,γ-unsaturated ketones of the cyclopentano polyhydro phenanthrene series and method of producing the same. No. 2,224,856. Adolf Butenandt to Schering Corp.

Process for preparing hydroxy-aldehydes and ketones from formaldehyde compounds. No. 2,224,910. William E. Hanford and Richard S. Schreiber to E. I. du Pont de Nemours & Co.

Process for catalytic hydrogenation of higher aliphatic nitriles. No. 2,225,059. Wilbur A. Lazier to E. I. du Pont de Nemours & Co.

Benzoyl benzoic acid derivatives. No. 2,225,088. John M. Tinker and Viktor M. Weinmayr to E. I. du Pont de Nemours & Co.

Process producing alpha-amino acetic acid. No. 2,225,155. Nicholas D. Cheronis.

A complex organic phosphate. No. 2,225,285. Clarence L. Moyle to The Dow Chem. Co.

Method preparing nuclear substituted diphenylamine. No. 2,225,368. David Craig to The B. F. Goodrich Co.

Process for the conversion of 17-cic-alcohols of the cyclopentanopoly hydrophenanthrene series into the corresponding 17-trans-alcohols. No. 2,225,419. Willy Logemann and Heinrich Koester to Schering Corp.

Method of preparing a vinyl halide and a catalyst for vapor phase reaction in said preparation. No. 2,225,635. Archie B. Japs to The B. F. Goodrich Company.

Higher molecular weight isocyanic acid esters. No. 2,225,661. Erik Schirm to Heberlein Patent Corp.

Method of producing hormone preparations of high purity. No. 2,225.662. Erwin Schwenk and Friedrich Hildebrandt, Max Gehrke to Schering Corp.

Manufacture of secondary aryl substituted alkyl ketones. No. 2,225,-671. Gerrit John Van Zoeren.

Method for making irradiated phenolphthalein. No. 2,225,756. Ludwig Pincussen to The Board of Trustees of the University of Illinois.

Production of secondary aliphatic nitrates. No. 2,225,893. Byron M. Vanderbilt to Standard Oil Company.

N:N′-Dialkyl-2:2′-dipyrazolanthronyls. No. 2,226,062. Jacob Koch and Max Brommer to Society of Chemical Industry.

Method of manufacturing basic lead trinitri-M-cresolate. No. 2,226,-391. Leon Rubenstein to Imperial Chemical Industries, Ltd.

U. S. Chemical Patents
Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 236

U. S. Chemical Patents

Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 237

Method for the extraction and purification of renin. No. 2,226,452. Wilbur Willis to Research Corp.

Method reducing an oxidized beryllium compound by means of hydrogen. No. 2,226,525. Paul M. Dolan to James C. Hartley.

Process for production of a physiologically active alkaloidal fraction from species of Erythrina. No. 2,226,528. Karl Folkers to Merck & Co., Inc.

Industrial Chemicals

Process for removing and recovering sulfur dioxide from waste gases. No. 21,631. Reissue. Henry F. Johnstone to Commonwealth Edison Company.

Method comprising contacting copper in the molten state with a molten siliceous treating composition containing dissolved therein a metal cyanide. No. 2,222,592. Frank J. Dobrovolny to E. I. du Pont de Nemours & Co.

Dealkylation process. No. 2,222,632. Alexander N. Sachanen and Rowland C. Hansford to Socony-Vacuum Oil Co., Inc.

Production of acid free flowers of sulfur. No. 2,222,679. Albert C. Mohn to San Francisco Sulphur Co.

Process of concentrating minerals of the class consisting of phosphate, calcite, barite, and fluorspar. No. 2,222,728. Francis X. Tartaron to Phosphate Recovery Corp.

Production of sulfur dioxide from calcium sulfate. No. 2,222,740. Ferdinand Bornemann, Hans Huber, and Hans Mengele to Chemische Werke, vorm.

Stable preparation consisting of dry physical mixture of interreactive acid and basic salts, characterized in that individual particles of salts are coated with soluble salt of sulfated aliphatic alcohols. No. 2,222,830. Henry V. Moss, Webster Groves, to Monsanto Chemical Co.

Method of restoring efficiency of thin beds of catalyst granules used for oxidation of ammonia. No. 2,222,884. Vernon M. Stowe to The Solvay Process Co.

Process for producing tetrachlorethylene. No. 2,222,931. Georg Basel, deceased, by Therese Basel and Erich Schaeffer. Georg Basel and Erich Schaeffer to Dr. Alexander Wacker Gesellschaft fur Elktrochemische Industrie G. m. b. H.

Process producing alkyl aromatic compounds boiling below 300° C. from heavy petroleum products. No. 2,223,133. Alexander N. Sachanen and Rowland C. Hansford to Socony Vacuum Oil Co.

A free flowing composition comprising a polyvalent metal soap, an oil-soluble wetting agent containing an SO_3 group and a liquid solvent for the polyvalent metal soap selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons and chlorinated hydrocarbons. No. 2,223,158. Francis J. Licata and Joseph P. Nothum to National Oil Products Co.

An improved process for working up liquefraction products from solid bituminous carbonaceous materials containing insoluble non-carbonaceous substances and selected from the class consisting of mineral coals, brown coals, shales and peat. No. 2,223,184. Mathias Pier, Walter Kroenig and Walfgang Jaeckh to William E. Currie.

Recovery of petroleum sulfonic compounds. No. 2,223,194. Kenneth M. Thompson to The Atlantic Refining Company.

A process for the recovery of olefins from hydrocarbon gas mixtures which comprises subjecting said mixture to contact with beta-trichloroethane and separating the olefins from the solvent. No. 2,223,197. Charles Wirth to Universal Oil Products Co.

Manufacture of stabilized animal and vegetable fats and oils. No. 2,223,244. Erich Bohm and Theodor Sabalitschka.

Method of making hydrous sodium silicates. No. 2,223,293. George R. McDaniel to Diamond Alkali Co.

Acid inhibitor for use in manufacture of organic nitrogen derivatives of "wood oils" produced from distillation of hard wood. No. 2,223,299. Kenneth G. Chesley to Corsett Chemical Co.

Process for the preparation of polyamides. No. 2,223,304. Wilbur A. Lazier to E. I. du Pont de Nemours & Co.

Organic phosphates. No. 2,223,329. Clarence L. Moyle to The Dow Chemical Co.

A process of producing melamine which comprises heating a member of the group consisting of cyanamide and dicyandiamide dispersed in lactamide in the presence of a small amount of an acid condensing agent. No. 2,223,333. Jack T. Thurston to American Cyanamid Co.

Reissue. Method producing a metallurgical coke from petroleum coke. No. 21,651. Earl W. Rice and Walter J. Buchele 66 2/3% to Courtney W. Kimler, Sr., and Harry Hall.

Method producing phenol from benzene. No. 2,223,383. Wendell W. Moyer and William C. Klingelhoefer to The Solvay Process Company.

Method for extraction of sterols. No. 2,223,398. William G. Bennett to Standard Brands, Inc.

Process for purifying crude pentaerythritol. No. 2,223,421. Max H. Hubacher and Arthur M. Matheson to Niacet Chemicals Corp.

Improvement in manufacture of $C\,Cl_4$ by reaction of charcoal and chlorine in presence of a sulfur catalyst. No. 2,223,448. Bruno Hennig to General Aniline & Film Corp.

Process for production of cyclic alcohols and ketones. No. 2,223,494. Donald J. Loder to E. I. du Pont de Nemours & Co.

Process oxidizing compound selected from group consisting of cyclohexane and homologues of cyclohexane. No. 2,223,500. Norman D. Scott and Joseph F. Walker to E. I. du Pont de Nemours & Co.

Granular fusion product consisting essentially of agglomerated sodium carbonate and sulfur with substantially all of the sodium carbonate and sulfur being chemically uncombined. No. 2,223,631. Robert B. MacMullin to The Mathieson Alkali Works, Inc.

Method for centrifuging and washing sugar massecuites and similar mixtures. Eugene Roberts and George E. Stevens to The Western States Machine Company.

As new article of manufacture, compressed pellet composed of mixture consisting of 1 part soda ash and 1-5 parts sodium dichromate. No. 2,223,771. Peter W. Uhl to The Ecclestone Chem. Co., Inc.

Denatured alcohol composition containing ethyl alcohol, an aliphatic aldehyde having 3-6 C atoms and mesityl oxide. No. 2,223,790. Paul Mahler and Carl Haner to Publicker, Inc.

In recovery of lactic acids from crude solutions thereof step of contacting said crude solutions with a nitroparaffin and separating the nitroparaffinlayer from the raffinate. No. 2,223,797. John B. Tindall to Commercial Solvents Corp.

Process for refining and obtaining valuable products from tall oil. No. 2,223,850. Frederick H. Gayer and Charles E. Fawkes to Continental Research Corp.

Method of producing sodium perborate of light weight in bulk, which consists in introducing stoichiometric quantity of sodium metaborate solution into 3-10% solution of peroxide of hydrogen over period of 2 to 5 hours. No. 2,223,903. Eduard von Drathen and Alois Kothe.

Spray-dried sugar mixture and process. No. 2,223,925. James F. Walsh to American Maize-Products Co.

Process for electrolytically producing arsenates. No. 2,223,929. Leo Lowenstein.

Method for thermally decomposing acid sludges which form a plastic froth when heated. No. 2,223,934. Blakeslee Barnes and Nicolay Titlestad to Chemical Construction Corp.

Amidin salts of alkyl naphthalene sulfonic acid. No. 2,223,935. Lloyd C. Daniels and Edward L. Kropa to American Cyanamid Co.

Dulcitol and mannitol borates and salts thereof. No. 2,223,948. Clarence Bremer to Atlas Powder Co.

Sorbitol borates and salts thereof. No. 2,223,949. Clarence Bremer to Atlas Powder Co.

Method of preventing liberation of spray or mist from the surface of an electrolyte in an electrolytic cell evolving gas which consists in adding a frothing agent to the electrolyte so as to form a layer of stable froth of the surface of an electrolyte occluding the gas. No. 2,223,973. Roscoe Teats to American Smelting & Refining Co.

Process and apparatus for purifying liquids deleteriously affected by air. No. 2,223,999. Theodore H. Miller to The De Laval Separator Company.

Cracking or pressure hydrogenation of hydrocarbons. No. 2,224,003. Mathias Pier and Walter Simon to William E. Currie.

Process of preparing dulcitol and mannitol monoborate monocondensation products. No. 2,224,011. Clarence Bremer to Atlas Powder Co.

Maleic acid and fumaric acid derivatives. No. 2,224,022. Peter Kurtz to General Aniline & Film Corp.

Process of producing fatty acid mono-esters of monochlorhydrin. No. 2,224,026. Gerhard Stein to General Aniline & Film Corp.

Method for quantitatively determining sulfur occurring in the form of sulfates and sulfites in a material that is thermally decomposable. No. 2,224,044. Charles B. Francis and Henry J. Wolthorn and Truman S. Woodward.

Production of hydrocarbons containing more than one C atom by catalytic conversion of gases containing CO_2 and H_2. No. 2,224,048. Wilhelm Herbert to American Lurgi Corp.

Process for catalytic conversion of gases containing CO_2 and H_2. No. 2,224,049. Wilhelm Herbert to American Lurgi Corp.

In manufacture of fruit vinegar the steps of producing a fruit juice from edible fruits, concentrating said juice by removal of water to such an extent that natural sugar contained therein is enriched up to minimum amount of 14% by weight of fermentable sugar, and subjecting said enriched juice to alcoholic fermentation, and thereafter subjecting the obtained alcoholic liquid to acetic fermentation. No. 2,224,059. Hans Mostny.

Process for treatment of olefin hydrocarbons with a combined catalyst consisting of a heavy metal sulfide and a heavy metal sulfate. No. 2,224,071. Albert Wassermann.

Cyclic process for the production of nitroparaffins. Nos. 21,657-658. Jerome Martin and Edward B. Hodge to Commercial Solvents Corp.

Process passing n-butane and 0.1-3.5 parts by weight chlorine per part n-butane into bath of molten metal chlorides maintained at temperature 175-550° C. No. 2,224,155. Chester C. Kennedy and Charles R. Russell to The Dow Chemical Company.

Method of preventing the formation of emulsions of tar and water during production of carburetted water gas and like fuel gases using petroleum residual oils as carburetting medium. No. 2,224,228. Charles A. Lunn and Arthur R. Belyea to Consolidated Edison Co. of N. Y., Inc.

Process for the manufacture of asphalt from waxy mineral oils. No. 2,224,372. Alvin P. Anderson to Shell Development Co.

A light diffusing non-borosilicate glass containing at least 65% of silica and also alkali oxide, alumina and at least 3% of analytically determined fluorine, being substantially free from second group oxides, the ration of alkali oxides to alumina being from 1.85 to 3.5. No. 2,224,469. Henry H. Blau to Corning Glass Works.

High silica glass composition. No. 2,224,493. William C. Taylor to Corning Glass Works.

A filling composition including an inert filler and colloidal magnesium-calcium silicate. No. 2,224,520. Howard D. Meincke, to A. M. Meincke & Co., Inc.

Process for the synthesis of drying oils from petroleum hydrocarbons. No. 2,224,603. Herman B. Kipper.

Manufacture of crystalline magnesium hydroxide. No. 2,224,780. Heinz H. Chesny.

Process for the manufacture of selenium-containing ruby glass. No. 2,224,791. Hans Loffler to Deutche Gold und Silber Scheidenstalt vormals Roessler.

Electrolytic fused bath. No. 2,224,820. Robert E. Hulse to E. I. du Pont de Nemours & Co.

Method for devolatilizing charcoal. No. 2,224,823. Harold E. Klein and Willard S. McVay to E. I. du Pont de Nemours & Co.

Preventing the caking of sodium perborate. No. 2,224,834. Joseph S. Reichert and Allen M. Taber to E. I. du Pont de Nemours & Co.

A hydrogen peroxide package for storing and handling said peroxide. No. 2,224,835. Joseph S. Reichert and Wilbie S. Hinegardner to E. I. du Pont de Nemours & Co.

Process making aluminum sulfate from a natural aluminum containing material. No. 2,224,888. John H. Walthall.

Process for production of butadiene which comprises heating a monocarboxylic acid ester of 2,3-butylene glycol in vapor phase to temperature 475-600° C. No. 2,224,912. Rowland Hill and Elias Isaacs to Imperial Chemical Industries, Ltd.

A process for the fractional distillation of fatty acids. Nos. 2,224,925-926. Ralph H. Potts and John E. McKee to Armour & Co.

Fatty acid distillation. No. 2,224,984. Ralph H. Potts and John E. McKee to Armour & Co.

Process of producing soap. No. 2,224,985. Ralph H. Potts and John E. McKee to Armour & Co.

Process treating oleaginous materials containing free fatty acids. No. 2,224,986. Ralph H. Potts and John E. McKee to Armour & Co.

Method of bonding fiber glass with carbon. No. 2,225,009. James F. Hyde to Owens-Corning Fiberglas Corp.

U. S. Chemical Patents

Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 238

Process for the simultaneous drying of gases and liquids. No. 2,225,045. Richard Gerlach to William E. Currie.

An oxidizable fatty material stabilized against development of color and rancidity. No. 2,225,124. George D. Martin to Monsanto Chemical Co. (St. Louis).

Method removing sulfur compounds from carbon dioxide gas comprising treating the gas with solution of a hexavalent chromium compound maintained in form of alkali chromate. No. 2,225,131. Gustave T. Reich.

Portland cement in dry finely divided form containing small percentage of a glycol uniformly distributed throughout cement and coating individual particles thereof. No. 2,225,146. Ira C. Bechtold to California Portland Cement Co.

Process grinding Portland cement clinkers admixed with small percentage of an alcohol ether to produce Portland cement in finely divided form. No. 2,225,147. Ira C. Bechtold to California Portland Cement Co.

Process grinding Portland cement clinkers admixed with small percentage of diglycol laurate to produce Portland cement in finely divided form. No. 2,225,148. Ira C. Bechtold to California Portland Cement Co.

Method making a mixture of Portland cement and a paraffin hydrocarbon-insoluble resin. No. 2,225,149. Ira C. Bechtold and Harry E. Kaiser to California Portland Cement Co.

A Portland cement having air particles mechanically entrapped within the cement. No. 2,225,150. Ira C. Bechtold and Harry E. Kaiser to California Portland Cement Co.

Nitrosation of phenolic mixtures. No. 2,225,358. John W. Teter to Sinclair Refining Co.

Process of obtaining sterol glucosides and sterols from fatty substances. No. 2,225,375. Henry R. Kraybill and Max H. Thornton to Purdue Research Foundation.

Preparation of cooked acid-precipitated casein. No. 2,225,387. Vernon J. Lowe and Arthur W. Bean.

Method recovering unfermentable residues from distillery slop. No. 2,225,428. Leo M. Christensen to The Chemical Foundation, Inc.

Process making acetic anhydride. No. 2,225,486. Howard L. Reichart, Jr., to Carbide and Carbon Chemicals Corp.

Production of paraffin by acting on carbon oxide in presence of a catalyst which is suitable for forming hydrocarbons, with gases containing free hydrogen. No. 2,225,487. Otto Roelen to Hydrocarbon Synthesis Corp.

Method forming comparatively pure casein. No. 2,225,506. Herbert E. Otting Westerville to M. & R. Dietetic Labs., Inc.

Process for production of methyl vinyl ketone comprises effecting pyrolysis of acetoin acetate in presence of substantially inert gas. No. 2,225,542. Clyve C. Allen and Vernon E. Haury to Shell Development Co.

Process preparing ethyl benzene. No. 2,225,543. James L. Amos to The Dow Chemical Co.

Process alkali refining animal and vegetable oils containing gums and free fatty acids. No. 2,225,557. Howard M. Duvall, Jr., to Refining, Inc.

Process for alkali refining glyceride oils deficient in gum content. No. 2,225,575. Benjamin H. Thurman to Refining, Inc.

Amine salts of nitro-phenols. No. 2,225,618. Edgar C. Britton & Frank B. Smith, to Dow Chemical Co.

Method for producing compounds of barium and strontium. No. 2,225,633. Lyle O. Hill and Sampson Isenberg to McLaughlin & Wallenstein.

Method purifying aqueous refrigerant solutions. No. 2,225,669. Robert B. Taylor.

Process of producing alkaline nitrate and chlorine. No. 2,225,685. Robert C. H. Chuffart to Henry W. Plucker.

Cyclic process of removing and recovering SO_2 from gases containing same. No. 2,225,744. J. T. Huntington.

Process for regenerating spent nickel catalysts. No. 2,225,782. Vladimir N. Ipatieff and Ben B. Corson to Universal Oil Products Co.

Process for regenerating spent metal catalysts in which metal is present in sulfide form. No. 2,225,811. Bryan D. Wells to Universal Oil Products Company.

Process for making free-flowing sugar composition for dusting and sugaring food substances which is non-hygroscopic and resistant to staining by grease. No. 2,225,894. John R. White and Joseph Avery Dunn to Lever Brothers Company.

Lead oxide and electrolytic process of forming the same. No. 2,225,904. Arthur L. Christensen to International Smelting & Refining Co.

Method increasing active chlorine content of bleaching powder. No. 2,225,923. Irving E. Muskat and George H. Cady to Pittsburgh Plate Glass Co.

Method for producing alkyl halides by reaction of olefins with hydrogen halides. No. 2,225,933. Ober C. Slotterbeck to Standard Oil Development Co.

Process for manufacturing esters. No. 2,225,944. Karl T. Steik to Standard Oil Development Company.

Process for dehydrating gases containing hydrocarbons and undesirable moisture. No. 2,225,959. Benjamin Miller to Power Patents Co.

Process for dehydrogenating heterocyclic bases. No. 2,226,057. Charles Graenacher and Jules Meyer to Society of Chemical Industry.

In manufacture ammonium sulfate by saturator process step comprising adding to liquor in saturator a mixture of an oil and a wetting agent which will not be attacked by the other compounds present. No. 2,226,101. Geoffrey Ogden to Imperial Chemical Industries, Ltd.

Process concentrating mica by froth flotation. No. 2,226,103. Francis X. Tartaron and Leslie Roth Harrison, Jr., Phosphate Recovery Corporation.

Method for reacting gas mixtures by means of precious metal catalysts. No. 2,226,113. George M. Chastian, Jr., to Hercules Powder Company and Baker & Co., Inc.

Process for solvent fractionation of oleoresinous gums. No. 2,226,129. Arthur W. Hixson and Ralph Miller to The Chemical Foundation, Inc.

Method removing an acid from water. No. 2,226,134. Otto Liebknecht and Herbert Corte to The Permutit Co.

Method for reacting gas mixtures by means of precious metal catalysts. No. 2,226,149. Fritz Zimmermann ½ to Baker & Co., Inc., and ½ to Hercules Powder Co.

Process refining animal and vegetable oils containing free fatty acids. No. 2,226,211. Benjamin H. Thurman to Refining, Inc.

Process for producing partially oxidized products of normally liquid aliphate hydrocarbons. No. 2,226,378. Wm. H. King and Clyde Q. Sheely.

In process for treating materials with chlorine step of contacting said materials with chlorine in presence of a sulfur chloride in apparatus having surfaces in contact with said chlorine of a metal containing major portion of nickel said sulfur chlorine being present in sufficient amount to maintain protective coating on said metal surfaces. No. 2,226,471. Leslie G. Jenness to Intermetal Corp.

Leather

Method treating raw shagreen, bearing skins including step of causing stream of abrasive material to impinge against skin thereby removing shagreen from said skin. No. 2,222,656. Frank C. Erkel.

Process deacidifying a leather tanned while using a chrome tanning agent. No. 2,225,083. Gerhard Otto and Eugen Immendoerfer to General Aniline and Film Corp.

Process loosening the hair of skins and hides comprises subjecting to treatment with alkaline material and to action of compound selected from group consisting of hydrosulfites, sulfoxylates and their organic derivatives. No. 2,225,601. Julius Pfannmuller to Wallerstein Co., Inc.

Metals, Alloys

Manufacture of ferrotitanium alloys. No. 2,222,795. John Ralph Davis and Jerome Strauss and Holbert E. Dunn to Vanadium Corp.

Manufacture of ferrotitanium alloys. No. 2,222,805. Jerome Strauss and Holbert E. Dunn to Vanadium Corp. of America.

Gold alloy consisting of about 33 to 84% gold, 11 to 67% copper, 0.1 to 5% cobalt, and 2 to 12% silver. No. 2,223,046. Arthur W. Peterson to Metals & Controls Corp.

Smelting lead ores in the Scotch hearth. No. 2,223,211. Carl G. Hershey and Luther J. Buck to American Smelting & Refining Co.

Process for the separation of nickel and copper. No. 2,223,239. Guenther Hamprecht, Leo Schlecht and Georg Trageser to I. G. Farbenindustrie Aktiengesellschaft.

Method preventing tarnishing of silver and brass. No. 2,223,327. Donald W. Light and Leonard Patrick Moore to American Cyanamid Co.

Process and apparatus for the direct recovery of heavy metals of the nonferrous group from ores and other primary materials. No. 2,223,569. Julius Lohse.

Iron-chromium-nickel-carbon-nitrogen heat-enduring alloy steels. No. 2,223,659. Oscar E. Harder and James T. Gow to Alloy Casting Research Institute, Inc.

Refining of pig iron and the production of steels and alloy steels. No. 2,223,738. Albert C. Nesfield to Low Moor Alloy Steelworks, Ltd.

Process improving yield point without appreciable increase in strength of cast magnesium base alloys. No. 2,223,852. Fritz Jaburek and Georg Schichtel to American Magnesium Metals Corp.

Cathode core alloy consisting of .5-1.5% Al, .25-.75% Si, .07-1.25% mg, .1.5% C and the balance Ni. No. 2,223,862. Emil G. Widell to Radio Corp. of America.

Production of electrolytic iron. No. 2,223,928. Marshall G. Whitfield and Victor Sheshunoff to Reynolds Metals Co.

Process for the production of metallic magnesium. No. 2,224,041. Darl Ebner to American Lurgi Corp.

Device for dry separation of precious metals from finely divided materials. Reissue. No. 21,653. Leroy E. Bigelow.

Magnesium base alloy containing beryllium and zirconium. No. 2,224,151. Gaston Gauthier to "Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges et Camargue."

Process producing magnesium by thermal reduction of magnesia and volatilization of magnesium. No. 2,224,160. John S. Peake and Foster C. Bennett to The Dow Chemical Co.

Process for treatment of articles composed of magnesium rich alloys comprising immersion of article in aqueous solution of alkali dichromate and metallic sulfate to which has been added an organic acidifying agent maintaining such solution at pH between 2.0 and 6.4. No. 2,224,245. Frank A. Allen to High Duty Alloys, Ltd.

Process and mechanism for treating metals or metal alloys in a molten state. No. 2,224,303. Siegfried Junghans.

Solder and method of manufacture. No. 2,224,356. Walter Momsen, 49% to J. Edward Yoch.

A hard, wear-resisting alloy melting between 2000 and 2300° F. No. 2,224,448. Robert W. Schlumpf, to Hughes Tool Co.

Protection of magnesium and magnesium alloys. No. 2,224,528. Hubert Sutton and Laurence F. LeBrocq.

Process of preparing a metal of the alkaline earth group consisting of calcium, barium and strontium which comprises thermally reacting an oxide of a metal of such group with silicon in the presence of a substantial proportion iron. No. 2,224,536. Joseph H. Brennan to Electro Metallurgical Co.

Electrolytic process for production of an alkali metal. No. 2,224,814. Harvey N. Gilbert to E. I. du Pont de Nemours & Co.

Precipitation hardened copper alloy. No. 2,225,339. Richards H. Harrington to General Electric Company.

An austenitic alloy steel. No. 2,225,440. Frederick M. Becket and Russell Franks to Electro Metallurgical Co.

Method for sulfidizing oxidized ores prior to flotation. No. 2,225,626. Ed. Eisenhauer, Jr.

Corrosion resistant steel article comprising silicon and columbium. No. 2,225,730. Percy A. E. Armstrong.

Method for electrolytic formation of fine mesh metal screens. Nos. 2,225,733-734. Watson Beebe to the Trumbull Metal Products Co.

Heat treated and artificially aged magnesium-free aluminum base alloy. No. 2,225,925. Joseph A. Nock, Jr., to Aluminum Co. of America.

An alloy having artificial radio-activity containing aluminum, magnesium, silicon, lead, manganese and mercury. No. 2,225,938. Oleg Yadoff.

Decarburized white iron casting. No. 2,225,968. Alfred L. Boegehold to General Motors Corp.

Ferrous alloys composed of carbon, silicon, titanium, phosphorous, manganese, chromium and iron. No. 2,225,997. Walter E. Jominy to General Motors Corp.

A dental alloy containing palladium, chromium and iron. No. 2,226,079. Jakob Spanner to Chemical Marketing Co., Inc.

Method for preventing intergranular oxidation in ternary beryllium alloys. No. 2,226,284. Richards H. Harrington to General Electric Co.

As an article of manufacture a structure having a surface of metal containing a major portion of nickel, said surface being provided with an integral protective film consisting of said metal of said surface, chlorine and sulfur. No. 2,226,472. Leslie G. Jenness to Intermetal Corp.

U. S. Chemical Patents

Off. Gaz.—Vol. 520, No. 4—Vol. 521, Nos. 1, 2, 3, 4—p. 239

Paper and Pulp

Process manufacturing from wood containing resins of high acid number a sulfite pulp substantially freed of resin and colored matter. No. 2,224,159. Arthur N. Parrett and Elliott H. Woodruff to Rayonier, Inc.

Process and apparatus for digesting fibrous material. No. 2,224,976. Albert D. Merrill.

Method of digesting fibrous material. No. 2,225,771. Thomas L. Dunbar to Chemipulp Process Inc.

Petroleum

A solid grease for heavy machinery operating at high temperatures. No. 2,221,591. Philip S. Clarke and William E. Bradley to Union Oil Company of California.

Process treating viscous petroleum oil containing appreciable amount of alkali and salt compounds of metals to reduce such metal content. No. 2,222,596. Eugene T. Scafe to Socony-Vacuum Oil Co.

Composition of matter comprising a sulfurized monohydric phenol extract of a mineral lubricating oil fraction. No. 2,222,643. John C. Zimmer to Standard Oil Development Company.

Method for separating mutually soluble components of a liquid mixture. No. 2,222,645. William W. Aldinger and William A. Hall to The Atlantic Refining Co.

Method of increasing anti-detonation characteristics of gasoline. No. 2,222,649. James H. Boyd, Jr., to The Atlantic Refining Co.

Method cracking hydrocarbon oil in vapor phase. No. 2,222,682. Arthur E. Nash to Petroleum Conversion Corp.

A drilling fluid comprising a mineral oil, a weighting material, and lampblack as a sedimentation inhibitor. No. 2,222,949. Rudolf A. Henkes to Shell Development Co.

Lubricating oil containing chlorinated naphthalene and calcium phenyl stearate. No. 2,222,964. Arnold C. Vobach to Sinclair Refining Co.

Process for dewaxing mineral oils. No. 2,223,022. Sijbren Tijmstra and Donald S. McKittrick to The Shell Development Co.

A monoaqueous drilling fluid comprising oil, finely divided solid material and blown asphaltic bitumen. No. 2,223,027. Reginald D. Dawson and Philippus H. Huisman to Shell Development Co.

Method for refining fatty oils. No. 2,223,077. Henry M. Stadt to Refining, Inc.

Lubricant. Nos. 2,223,127-130. Carl F. Prutton to The Lubri-Zol Corp.

Method for solvent dewaxing of a wax-bearing petroleum stock. No. 2,223,141. Arnold C. Vobach to Sinclair Refining Co.

Process for the low temperature conversion of hydrocarbon oils. No. 2,223,162. Wayne L. Benedict to Universal Oil Products Co.

Isomerization of paraffin hydrocarbons. No. 2,223,180. Charles S. Lynch and John E. Wood, III, to Standard Oil Development Co.

A compression-ignition engine fuel comprising a hydrocarbon Diesel fuel blended with a minor quantity of an ether oxime in sufficient amount to improve the ignition quality of the fuel. No. 2,223,181. Pharis Miller and Gould H. Cloud to Standard Oil Development Co.

Process for conversion of hydrocarbon oils. No. 2,223,192. Kenneth Swartwood to Universal Oil Products Co.

Lubricant composition and method of lubrication. No. 2,223,272. Theodore G. Roehner and Carroll N. Rill to Socony-Vacuum Oil Co., Inc.

An alkyl derivative of a hydroxydiphenyl sulfonate of which alkyl group is derived from hydrocarbon of a petroleum distillate containing 7-35 C atoms. No. 2,223,363. Lawrence H. Flett to National Aniline and Chemical Company, Inc.

Method of producing higher alkyl aromatic sulfonates. No. 2,223,364. Lawrence H. Flett to National Aniline and Chemical Company, Inc.

Mineral oil composition. No. 2,223,411. Everett W. Fuller and Lyle A. Hamilton to Socony-Vacuum Oil Company, Inc.

Composition of matter comprising petroleum lubricating oil and .5-30% of a licanic metal soap soluble in said lubricating oil. No. 2,223,473. Peter J. Wiezevich (Peter J. Gaylor) to Standard Oil Development Co.

Method refining cracked gasoline. No. 2,223,524. Boris Malishev 30 1-3% to Universal Development Corp., and 3% to John P. Nikonow.

Method of solid catalyst disposal. No. 2,223,643. Bernard H. Shoemaker to Standard Oil Company.

Composition of matter comprising in combination hydrocarbon oil intimately admixed with .1-10% by weight of a halogenated, aromatic ketone. No. 2,223,766. Bert H. Lincoln, Waldo L. Steiner and Gordon D. Byrkit to The Lubri-Zol Development Corp.

Lubricating composition. No. 2,223,793. Norman E. Peery to Shell Development Company.

Process for the removal of acid components from hydrocarbon distillates. No. 2,223,798. David L. Yabroff and Ellis R. White to Shell Development Co.

Lubricant comprising mineral lubricating oil containing small proportion of a metallic betadiketone. No. 2,223,932. Charles C. Towne to The Texas Co.

Device for depositing two chemicals in a well simultaneously. No. 2,223,936. Sterling P. Hart to Texaco Development Corp.

Continuous process for alkylation of hydrocarbons. No. 2,223,938. Ernest F. Pevere, Louis A. Clarke and George B. Hatch to The Texas Co.

Process dewaxing petroleum stock. No. 2,223,939. Leo D. Jones to The Sharples Corp.

Process of improving lubricating oils to decrease tendency to cause corrosion of metal surfaces. No. 2,223,941. Sidney Musher to Musher Foundation, Inc.

Method for control of catalytic processes. No. 2,224,014. George S. Dunham and Ernest Utterback to Socony-Vacuum Oil Company, Inc.

Process alkylating isoparaffins with olefins. No. 2,224,102. Melvin M. Holm, Eugene H. Oakley and Robert L. Humphreys to Standard Oil Co. of Cal.

Process for dewaxing petroleum oils. No. 2,224,109. Walter V. Stearns to Sun Oil Co.

Treatment of oil wells which comprises interrupting circulation of drilling mud, and coating that portion of well hole containing opening with a casein plastic by introducing into well a pumpable casein dispersion, containing in excess 5% by weight of casein on total weight of dispersion. No. 2,224,120. Sterling P. Hart to The Texas Co.

Process for refining cracked petroleum distillate. No. 21,655. Reissue. William T. Hancock.

Method lubricating Cu-Ag-Cd and Cu-Ni-Pb bearings operated at elevated temperatures without substantial corrosion, comprises use of petroleum oil containing an aryl substituted thiourea. No. 2,224,158. Ernest M. Marks and James W. Johnson to The Atlantic Refining Co.

Method of recovering gasoline from gases. No. 2,224,227. Percival C. Keith, Jr., and Henry M. Nelly, Jr., to The M. W. Kellogg Co.

Modified lacquer and varnish diluent. No. 2,224,291. Theodore R. Donlan to Standard Oil Development Co.

Process producing synthetic hydrocarbon oils of high viscosity index. No. 2,224,349. Melvin M. Holm, Arthur L. Lyman and Marvin F. Müller to Standard Oil Company of Calif.

Lubricant comprising mineral lubricating oil and small amount of alkaloid salt of organic carboxylic acid of at least six carbon atoms. No. 2,224,368. John M. Musselman and Herman P. Lankelma to The Standard Oil Co.

Lubricating oil comprising a viscous hydrocarbon oil containing small amount, sufficient to increase materially film strength of said oil, of a synthetically prepared ester having B.P. above 150°C. of a cyclic acid and of an alcohol having not more than 3 hydroxyl groups. No. 2,224,541. Per K. Frolich to Standard Oil Development Co.

Method treating hydrocarbon oils to convert higher boiling hydrocarbons into lower boiling hydrocarbons. No. 2,224,570. Helge C. Dieserud to The Texas Co.

Process for treating normally gaseous hydrocarbons. No. 2,224,631. Wright W. Gary to The Polymerization Process Corp.

Process refining hydrocarbon oil containing chemically unstable components. No. 2,224,636. George A. Lorenz to Shell Development Co.

Conversion of hydrocarbon oil for production of motor fuel. No. 2,224,840. Le Roy G. Story to The Texas Co.

Coloring of petroleum distillates. No. 2,224,904. Harold W. Elley and Herbert W. Daudt to E. I. du Pont de Nemours & Co.

Method heating hydrocarbon oils to cracking temperature. No. 2,224,917. Lev. A. Mekler to Universal Oil Products Co.

Polymerization product and process for producing the same. No. 2,225,266. Frederick E. Frey and Robert D. Snow and Louis H. Fitch, Jr., deceased, by First National Bank in Bartlesville, to Phillips Petroleum Co.

Lubricating composition containing a halogen derivative of a substantially saturated linear aliphatic hydrocarbon compound having molecular weight above 800 and containing at least 1% of halogen. No. 2,225,318. Arnold J. Morway and Floyd L. Miller to Standard Oil Development Co.

Catalytic condensation of hydrocarbons. No. 2,225,347. William Mendius to Sinclair Refining Co.

Lubricants. Nos. 2,225,365-367. Ulric B. Bray to Union Oil Co. of Calif.

Continuous duosol extraction process for separating a hydrocarbon oil into portions of different properties. No. 2,225,396. Alvin P. Anderson to Shell Development Co.

In process for conversion of hydrocarbons in contact with an organic structural catalyst, step of periodically reactivating said catalyst. No. 2,225,402. George E. Liedhomn to Shell Development Co.

Solvent and process for dewaxing mineral oils. No. 2,225,403. Donald S. McKittrick and Hilary J. Henriques to Shell Development Company.

A lubricating oil of low pour point. No. 2,225,430. Stewart C. Fulton to Standard Oil Development Co.

Transformer oil comprising petroleum oil containing 2,6-ditertiary-butyl-4-methyl phenol and diphenylamine. No. 2,225,533. Milton A. Dewey to Gulf Research & Development Company.

Alkylation process for producing motor fuel which comprises reacting isoparaffinic hydrocarbons of less than 7 C atoms per molecule with olefinic hydrocarbons having more than 2 C atoms per molecule. No. 2,225,544. Arthur L. Blount to Union Oil Co. of Calif.

Process of dewaxing oils, which comprises subjecting oil to the action of butylamine, chilling, and separating wax. No. 2,225,546. Robert E. Burk and Everett C. Hughes to The Standard Oil Co., Corp. of Ohio.

A solid extreme pressure lubricant comprising a sulfurized unsaturated hydrocarbon polymers and a soap. No. 2,225,684. Martin B. Chittick to The Pure Oil Company.

Apparatus for deparaffining oil wells. No. 2,225,775. David L. Garrett.

Process for isomerization of straight chain paraffin hydrocarbons which comprises subjecting said hydrocarbons to action of zirconium chloride and hydrogen chloride. No. 2,225,776. Aristid V. Grosse and Herman Pines to Universal Oil Products Company.

Process for conversion normally gaseous hydocarbons to normally liquid hydrocarbons. No. 2,225,814. Malcolm P. Youker to Phillips Petroleum Company.

Process for breaking petroleum emulsions of the water-in-oil type. No. 2,225,824. Melvin De Groote and Arthur F.Wirtel to Petrolite Corp., Ltd.

Process for sweetening sour hydrocarbon distillate. No. 2,225,847. Wm. B. Shanley and Robert E. Sutherland to Universal Oil Products Co.

Process for segregation of a mineral oil into relatively more aromatic and relatively more paraffin constituents. No. 2,225,910. George W. Gurd and Walter N. Munster to Standard Oil Development Co.

A motor fuel comprising gasoline and di-isopropyl ketone in which the di-isopropyl ketone forms from 5 to 50% of the fuel. No. 2,225,942. Helmuth G. Schneider and Wm. H. Smyers to Standard Oil Development Co.

Method solvent refining residual lubricating oil stock. No. 2,226,092. Louis A. Clarke to The Texas Co.

Method controlling hydrocarbon conversion process. No. 2,226,097. John Happel and Geoffrey W. Robbins to Socony-Vacuum Oil Co.

Process for breaking petroleum emulsions of the water-in-oil type. No. 2,226,118. Melvin De Groote to Petrolite Corp., Ltd.

Flooding process for recovering oil from subterranean oil-bearing strata. No. 2,226,119. Melvin De Groote and Bernhard Keiser to Petrolite Corp., Ltd.

Process for resolving petroleum emulsions of the water-in-oil type. No. 2,226,120 to 2,226,123. Melvin De Groote and Bernhard Keiser and Arthur F. Wirtel to Petrolite Corp., Ltd.

Viscous petroleum oil containing a dicyclohexylamine as color stabilizing agent. No. 2,226,160. Melvin A. Dietrich to E. I. du Pont de Nemours & Co.

Improved diesel fuel comprising hydrocarbon fuel oil containing small percentage of an organic compound. No. 2,226,298. Homer B. Wellman to Standard Oil Co. of Calif.

Patents on Paints & Pigments, Resins, Plastics, Rubber and Textiles for these Volumes will be given next month.

Foreign Chemical Patents
Belgian, Canadian, English and French—p. 38

Abstracts of Foreign Patents

Collected from Original Sources and Edited

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To assist those making use of this summary, it might be well to comment briefly on the system used by each of these countries in reporting patents.

Canada grants the patent on the date of publication. Printed copies are not obtainable, but typewritten certified copies may be obtained at a cost averaging about five dollars each.

English "patents" here reported are known as *Complete Specifications Accepted*. They are printed for distribution at a cost of 1s. 1d. each. They are subject to opposition by interested parties for a period of two months from date of publication.

French patents are granted several months before publication. Allowed applications are open to public inspection on payment of a fee, but no copies may be purchased nor notes made from the original. Printed copies of specifications are available to public several months after issue at 10 francs each, plus postage.

Belgian patents are granted several months before publication. No printed copies are available, but photostat copies may be obtained at a cost of from 3.5 to 4.5 francs per page.

In this digest the latest available data will be published as obtained from original sources. It will be readily understood that present conditions bring about delays in transportation and for that reason the coverage will vary from month to month. We expect shortly to be able to begin publication of abstracts of German patents.

Present conditions make it impossible to obtain printed copies or photostats of French and Belgian patents, but this should shortly be corrected. We shall be glad to assist those interested in obtaining copies of Canadian and English patents. Your comments and criticism will be appreciated.

BELGIAN PATENTS

Granted October 31, 1939; Published May 5, 1940.

Process and apparatus for decorticating pulp wood. No. 436,479. Zellstoffabrik Waldhof.

Improvement in manufacture of active carbon. No. 436,286. Carbo-Norit-Union Verwaltings-Gesellschaft m. b. H.

Process for the manufacture of stable preparations of vitamin-E. No. 436,396. Produits Roche, S. A.

Process for improving the baking properties of flour. No. 436,488. Produits Roche, S. A.

Improvements in welding and brazing metals. No. 436,274. W. L. Ulmer.

Process for fusing acid ores. Nos. 436,374, 436,456 and 436,495. Kohle und Eisenforschung G. m. b. H.

Process for the prevention of oxidation in the treatment of liquid amalgams of zinc. No. 436,423. I. G. Farbenindustrie A. G. and Duisburger Kupferhutte.

Process for phosphating iron to prevent corrosion. No. 436,438. I. G. Farbenindustrie A. G.

Agglomerated combustibles and process of manufacture. No. 436,468. A. Vloeberghs.

Improvements in magnesium alloys. Nos. 436,516, 436,517 and 436,518. Georg von Giesche's Erben.

Improved zinc alloy free of copper. No. 436,519. Georg von Giesche's Erben.

Improvements in apparatus for the spray pulverizing of melted metals. No. 436,533. S. Hiller.

Process for the manufacture of magnesium-zirconium alloys. No. 436,548. I. G. Farbenindustrie A. G.

Process and apparatus for the manufacture of glass fibres. No. 436,829. Algemeene Kunstvesel Mij. N. V.

Improvements in the production of silicious bodies. No. 436,308. N. S. Garbisch.

Process for improving the opacity and color of powdered enamels. No. 436,353. Auersgesellschaft A. G.

Improvements in cyclic processes of ion exchange. No. 436,866. Ets. Philips & Pain (S. A.).

Copper covering of silver mirrors. No. 436,515. Peacock Laboratories, Inc.

Process and apparatus for purifying oils. No. 436,972. The Baker Castor Oil Co.

Improvements in polymerizable compositions. No. 436,030. Imperial Chemical Industries, Ltd.

Improvements in the manufacture of halogenated derivatives of ethylene polymers. No. 436,091. Imperial Chemical Industries, Ltd.

Process for the obtainment of cerium dioxide. No. 436,280. Deutsche Gold und Silber Scheideanstalt vormals Roessler.

Process and apparatus for concentrating solutions, particularly those of molasses. No. 436,299. C. V. Rowell.

New aminonaphtholsulfonic acids, monoazo dyes derived therefrom, and process for manufacturing. No. 436,330. I. G. Farbenindustrie A. G.

Process for converting illuminating gas to a non-toxic condition. No. 436,335. Metallgesellschaft A. G.

Process for the obtainment of phenols. No. 436,358. I. G. Farbenindustrie A. G.

Monoazo dye and process for its manufacture. No. 436,391. I. G. Farbenindustrie A. G.

Process for preparing lactones of the cyclopentanopolyhydrophenanthrene series. No. 436,397. Société pour l'Industrie Chimique a Bâle.

Manufacture of bitumens. No. 436,408. Vedag Vereinigte Dachpannen-Fabriken A. G.

Process for the preparation of new sulfur compounds. No. 436,414. I. G. Farbenindustrie A. G.

Process for the manufacture of isoquinolein compounds. Nos. 436,421 and 436,422. Troponwerke Dinklage & Co.

Process for the manufacture of anti-corrosion coating. No. 436,440. Schieferwerke Ausdauer A. G.

Process for the treatment of milk. No. 436,490. B. Spur.

Process for the production of titanium dioxide. No. 436,472. Titangesellschaft m. b. H.

Production of waterproofing coatings. No. 436,499. I. G. Farbenindustrie A. G.

New polymers and process for their manufacture. No. 436,539. E. I. du Pont de Nemours & Co.

Rubber-base heat and corrosion resistant products. No. 436,546. N. V. Hollandsche Draad-en Kabelfabriek.

Process for the improvement of synthetic linear polyamides. No. 436,377. E. I. du Pont de Nemours & Co.

Motor fuel containing methyl formiate and an organometallic anti-knock agent. No. 436,246. Standard Oil Development Company.

Process for the preparation of photographic emulsions. No. 436,318. Kodak-Pathé Société Anonyme Française.

Process for the manufacture of polarized films. No. 436,541. E. I. du Pont de Nemours & Co.

CANADIAN PATENTS

Granted and Published October 8, 1940.

Production of chlorine by catalytic oxidation of hydrogen chloride with oxygen at about 800° C. No. 391,759. Air Reduction Company, Inc. (Frederick R. Balcar).

Apparatus for and method of heat exchange. No. 391,765. Aktiengesellschaft Brown, Boverie & Cie. (Walter G. Noack).

Improvements in process of manufacturing rayon yarn for tire cord. No. 391,767. American Viscose Corporation (Isaac P. Davis).

Water-in-oil stable homogeneous paint emulsion for painting wet surfaces. No. 391,779. Canadian Gypsum Company, Limited (Herman A. Scholz).

Manufacture of alcohol by hydration of olefin. No. 391,794. Carbide and Carbon Chemicals, Limited (James F. Eversole and Edward W. Doughty).

Manufacture of styrene and compounds by method comprising pyrolyzing an alkylated aromatic hydrocarbon containing at least two carbon atoms in a side chain by mixing with superheated steam. No. 391,799. The Dow Chemical Company (Robert R. Dreisbach).

Process for incorporating pigments in cellulose nitrate compositions. No. 391,800. E. I. du Pont de Nemours & Co., Inc. (Robert T. Hucks).

Process for delustering in synthetic fibre manufacture. No. 391,801. E. I. du Pont de Nemours & Co., Inc. (Wallace H. Carothers).

Food products base consisting of Vitamin B, enzymes, lactic acid and simple sugars. No. 391,808. George A. Jeffreys.

Process for giving cellulosic materials permanent water-repellent properties. No. 391,812. Imperial Chemical Industries Limited (Reginald J. W. Reynolds, Eric E. Walker and Clarence S. Woolvin).

Process for imparting water-repellent properties to textile fibres. No. 391,813. Imperial Chemical Industries, Limited (Alfred W. Baldwin, John G. Evans, Reginald J. W. Reynolds, Charles E. Salkeld, Eric E. Walker and Clarence S. Woolvin).

Process for imparting to cellulosic material durable water-repellent properties. No. 391,814. Imperial Chemical Industries, Limited (Alfred W. Baldwin, John G. Evans and Charles E. Salkeld).

Nickel alloy including zirconium and a member of the group consisting of boron and phosphorus. No. 391,817. The International Nickel Company, Inc. (Augustus E. Kayes).

Preparation of suspensions of inorganic pigment particles in waxes. No. 391,823. Canadian Titanium Pigments, Limited (Walter W. Plechner and Joseph M. Jarmus).

Preparation of titanium dioxide pigments from titanium-bearing siliceous minerals containing alkaline earth metals. No. 391,824. Canadian Titanium Pigments, Ltd. (Hugh V. Alessandroni).

Beneficiation of titano-silicate minerals for recovery of titanium. No. 391,825. Canadian Titanium Pigments, Limited (Hugh V. Alessandroni).

Foreign Chemical Patents
Belgian, Canadian, English and French—p. 38

Foreign Chemical Patents

Belgian, Canadian, English and French—p. 39

Preparation of titanium dioxide pigments from titano-silicate minerals. No. 391,826. Canadian Titanium Pigments, Limited (Hugh V. Allessandroni).

Method of producing bonded surface layers including cellulose particles. No. 391,835. Plaskon Company, Inc. (Arthur M. Howald and Leonard S. Meyer).

Producing mono-ethanol amine by reacting ammonia and an ammonium salt of a weak acid with ethylene oxide at temperature below that at which the salt dissociates. No. 391,841. Shell Development Company (Arthur F. A. Reynhart).

Process of impermeabilizing porous structures with pumpable solutions of asphaltic bitumen in a water-insoluble solvent of aliphatic character. No. 391,842. Shell Development Company (Jacob van den Berge and Folkert Dijkstra).

Production of pheol by oxidation of hydrocarbons. No. 391,844. The Solvay Process Company, Inc. (Wendell W. Moyer and William C. Klingelhoefer).

Production of alkyl derivatives of cyclic hydrocarbons in presence of aluminum chloride. No. 391,854. Universal Oil Products Company (Vladimir Ipatieff and Aristid V. Grosse).

Alloy for addition to iron and steel containing about 25-60% Si, 5-25% Ti, 5-25% Zr, the sum of which does not exceed 85%, and not over 4% C, the balance principally Fe. No. 391,855 (see also No. 391,856). Vanadium Corporation of America (George L. Norris).

Addition alloy for dioxidizing steel and iron containing about 4-20% Ti, 8-30% Al, 10-45% Si, and not over 0.4% C, the balance either Mn or Fe or both. No. 391,857. Vanadium Corporation of America (Jerome Strauss and George L. Norris).

Impregnation composition comprising reaction product of a solution of ammonium sulfate, ammonium phosphate, boric acid, colemanite, phenol, barium hydroxide, tin chloride, an alginate, and ammonia. No. 391,861. Olaus T. Hodnefield (O. T. Hodnefield and Warren W. Shartel).

Stabilizing organic derivatives of cellulose by treating with a morpholine compound. Nos. 391,865 and 391,866. Camille Dreyfus (George W. Seymour).

Preparing organic acids by contacting an aldehyde and water, in vapor phase, with a dehydrogenative catalyst and a directive catalyst base, the latter comprising a partially hydrolyzable salt of an amphoteric base and an organic acid. No. 391,869. William J. Hale.

ENGLISH COMPLETE SPECIFICATIONS

Accepted and Published July 24, 1940.

Manufacture of hydrocarbon copolymers. No. 523,248. Standard Oil Development Co.

Manufacture and application of ether and ester condensation products. No. 523,396. Society of Chemical Industry in Basle.

Controlling swelling in the carbonization of bituminous material. No. 523,250. H. J. Hodsman.

Austenitic steels. No. 523,251. Inland Steel Company.

Conversion of hydrocarbons. No. 523,252. Universal Oil Products Co.

Removal of gas from organic liquids. No. 523,346. Eastman Kodak Co.

Coagulation of aqueous dispersions. No. 523,208. E. I. du Pont de Nemours & Co.

Separation of aluminum from aluminum foils associated with foreign substances. No. 523,209. K. Schmidt.

Dressing coals, shales, and like carbonaceous substances. No. 523,211. H. Osawa.

Manufacture of gases containing carbon monoxide. No. 523,221. Power-Gas Corp., Ltd.

Production of emulsions from synthetic resins. No. 523,222. Catalin, Ltd.

Materials coated with a derivative of cellulose. No. 523,231. British Celanese, Ltd.

Manufacture of melamine. No. 523,448. Society of Chemical Industry in Basle.

Production of ethers containing fluorine. No. 523,449. Imperial Chemical Industries.

Stabilization of organic materials in the presence of copper. No. 523,451. E. I. du Pont de Nemours & Co.

Production of resinous condensation products. No. 523,256. Beck, Koller & Co. (England), Ltd.

Breaking down the cells of bran and germs of cereals. No. 523,262. P. Lowenbach.

Aeration of plaster of Paris compositions. No. 523,264. Gyproc Products, Ltd.

Process of manufacturing sugar and molasses from sacchariferous plants. No. 523,268. G. Lambinon.

Preservation of rubber. No. 523,456. Imperial Chemical Industries, Ltd.

Bituminous concrete. No. 523,458. J. Oberbach.

Manufacture of cellulosic fibrous electrical insulating material. No. 523,279. Pirelli-General Cable Works, Ltd.

Materials and process for the production of heavy suspensions. No. 523,459. A. Pearson.

Removal of aluminum as an impurity from tin-containing metals or alloys, such as lead-tin alloys. No. 523,303. National Lead Company.

Method of manufacturing fusible elements for electric fuses. No. 523,309. Callender's Cable and Construction Co., Ltd.

Manufacture of bisoxyphenyl compounds. No. 523,320. Boots Pure Drugs Co., Ltd.

Method and apparatus for coating stainless steel surfaces. No. 523,322. Revere Copper & Brass, Inc.

Purification of sulfur. No. 523,465. Imperial Chemical Industries, Ltd.

Process for the manufacture of hydroxyalkylamides. No. 523,466. Imperial Chemical Industries, Ltd.

Vapor phase bleaching. No. 523,467. Imperial Chemical Industries, Ltd.

Treatment of water. No. 523,381. Permutit Co., Ltd.

Apparatus for removing sediment and/or scum from settling tanks and reservoirs. No. 523,422. C. Davis and W. G. Farrer.

Metallurgical reactions effected by electrical induction. No. 523,434. K. M. Tigerschiold and B. I. Sahlin.

Process of decomposing crystallized ferrous sulfate. No. 523,241. P. de Lattre.

Manufacture of azo compounds. No. 523,294. G. H. Ellis, H. C. Olpin and J. Wright.

FRENCH PATENTS

Granted January 29 and Published February 15, 1940.

Apparatus for decorticating peanuts, etc. No. 854,875. Louis Samat et ses Fils.

Apparatus for the production of corrugated paper. No. 854,979. C. A. Carrière.

Process for extraction of glucinium from its ores. No. 854,882. Mij. voor Thermo-Chemie N. V.

Process for depositing corrosion resisting layers on articles of aluminum and its alloys. No. 854,932. M. Schenk.

Process for the manufacture of alkaline nitrates from their chlorides. No. 854,809. Ammoniaque Synthétique et Dérivés S. A.

Process for the manufacture of melamine. No. 854,949. Société pour l'Industrie Chimique a Bale.

Treatment of dilute wash from washing of soda cellulose. No. 854,970. S. M. Hjelte.

Textile treating agents. No. 854,908. Imperial Chemical Industries, Limited.

Improved lacquer. No. 854,912. Herbig-Haarhaus A. G.

Centrifugal separation of wax from hydrocarbons. No. 854,900. Aktiebolaget Separator Nobel.

Process for the production of synthetic hydrocarbons. No. 854,903. N. V. Internationale Hydrogeneerings Octrooien Mij.

Catalyst for the conversion of hydrocarbon oils. No. 854,909. Standard Oil Development Company.

Process for preparing saturated hydrocarbons having branched chains from saturated hydrocarbons boiling at about 160° C. No. 854,936. N. V. de Bataafsche Petroleum Mij.

Reaction chamber for the treatment of hydrocarbons. No. 854,957. Standard Oil Development Company.

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Process for refining and removing paraffin from oily hydrocarbons. No. 854,960. Aktiebolaget Separator Nobel.

Process for production of motor fuels. No. 854,962. N. V. Internationale Hydrogeneerings Octrooien Mij.

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Process for the manufacture of synthetic matter similar to rubber. No. 854,956. Imperial Chemical Industries, Limited.

Preparation of asphalt from products containing paraffin. No. 854,884. N. V. de Bataafsche Petroleum Mij.

Preparation of agglomerates from fibrous vegetable matter. No. 854,893. H. Basler.

Preparation of glyoxal condensation products. No. 854,959. I. G. Farbenindustrie A. G.

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Granted February 5 and Published February 22, 1940.

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Process and apparatus for winding wet artificial silk. No. 855,150. Barmer Maschinenfabrik A. G.

Improved artificial fibres and process of preparation. No. 855,286. Sandoz, S. A.

Process of fire-proofing cloth, coating and varnishes for cloth, cellulose paints, etc. No. 855,030. L. M. C. Labaune.

Process for developing dyes of tetrasulfuric ether-salts of the tetrahydro-1: 2-2': 1'-dianthraquinoneazine. No. 855,118. Durand & Hugnenin S. A.

Insecticide for impregnation of textiles. No. 855,176. P. Nestler.

Process for the production of emulsion particularly for the coating of paper. No. 855,238. Becker & Co., Ltd.

Improvements in apparatus for the treatment of ores. No. 855,180. Anglo-Oriental (Malaya), Limited.

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Process and apparatus for heat treatment of light metal pieces. No. 855,278. Heuschel Flugzeng-Werke A. G.

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Process for the preparation and use of copper nitrate. No. 855,197. Ets. Loyer et Société Chimique de Massy-Palaisseau Réunis.

Process for the preparation of optically active menthones and menthols. No. 855,262. Howard & Sons.

Acid dyes of the anthraquinone series and process for their preparation. No. 855,055. I. G. Farbenindustrie A. G.

New naphthol-sulfonic acids, azo dyes derived therefrom, and process for preparation. No. 855,112. I. G. Farbenindustrie A. G.

Process and apparatus for producing metal coatings. No. 855,258. Fides Ges. für die Verwaltung und Verwertung von Gewerblichen Schutzrechten m. b. H.

Improvements in the synthesis of hydrocarbons by transforming carbon monoxide with hydrogen. No. 855,136. N. V. Internationale Koolwaterstoffen Synthese Mij.

Elimination of naphthenic acids from mineral oils or fractions boiling at about 250° C. No. 855,165. N. V. de Bataafsche Petroleum Mij.

Lubricating product. No. 855,166. Standard Oil Development Company.

Transformation of carbon monoxide with hydrogen into hydrocarbons the molecule of which includes more than one carbon atom. No. 855,270. N. V. Internationale Koolwaterstoffen Synthese Mij.

Vulcanizing accelerator. No. 855,143. United States Rubber Co.

Process for the preparation of artificial resins. No. 855,271. I. G. Farbenindustrie A. G.

Process for air-conditioning. No. 855,026. G. H. Baudot.

Feed-water treatment. No. 855,027. J. Vieilly.

Separation of chilled wines and other bodies into liquid-phase and solid-phase portions. No. 855,060. J. G. Daloz.

Base-exchange water softening apparatus. No. 855,122. Aktiebolaget Elektrolux.

Polymerization products and process of production. No. 855,139. I. G. Farbenindustrie A. G.